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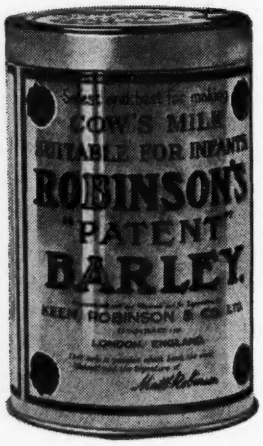

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CERTAIN PRINCIPLES IN THE TREATMENT OF OBSTRUCTIVE JAUNDICE*

WALTMAN WALTERS, M.D.†

SECTION OF SURGERY, THE MAYO CLINIC

ROCHESTER, MINNESOTA

Cases in which there are obstructive lesions anywhere are exceedingly interesting. Particularly is this true of obstruction of the biliary and urinary tracts, for with the obstruction the constituents of bile and urine are absorbed into the circulation and later into the tissues; impairment in function of the liver or kidneys is next in order, and later, injury to the parenchyma of the liver and kidneys occurs. As a result of accumulation of abnormal products in the blood serum and tissues of the body, resulting from obstruction and the effects of the disintegration of hepatic and renal cells, the patients become seriously ill, and measures directed toward their recovery must be instituted. These should consist not only of removal of the obstruction but of attempts to compensate for as many as possible of the disturbed physiologic processes which have taken place.

Obstructions of the biliary tract are of two types: those due to lesions within the liver and those due to lesions obstructing the extrahepatic biliary passages. All physi-

*The Mayo Lecture in Surgery delivered at the University of Michigan Medical School, June 18, 1931.

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cians are familiar with cases of catarrhal jaundice and no doubt all have seen some cases of acute yellow atrophy of the liver. Probably the most common of the intrahepatic obstructions of the biliary tract are those due to hepatic cirrhosis. The most common causes of extrahepatic biliary obstruction are gallstones in the common or hepatic bile ducts; strictures of the ducts, usually secondary to operative injuries to the ducts, and tumors of the head of the pancreas, usually carcinoma, obstructing the pancreatic portion of the common bile duct.

Whereas in intrahepatic obstruction, the onset of painless jaundice is the characteristic feature, in obstructing lesions of the common and hepatic bile ducts intermittent pain is a prominent and characteristic feature. In this respect, I think it is worth while to direct attention to the fact that pain associated with obstructive jaundice is dependent on the degree of obstruction, and the rapidity with which it takes place, whether it is due to stones, strictures, or tumor of the pancreas. Hence it should be emphasized that gallstones may obstruct the common or hepatic ducts without producing pain, and, by the same token, pancreatic obstruction of the common bile duct may be occasionally accompanied by biliary colic.

THE EFFECT OF OBSTRUCTION OF THE COMMON BILE DUCT WITH ASSOCIATED JAUNDICE

With an obstructing lesion of the common or hepatic bile duct, bile is retained within the biliary tract and is reabsorbed into the blood serum. Cholemia is frequently associated in the minds of many, with a group of symptoms indicative of as grave a condition as that with which uremia is associated when it relates to renal insufficiency. From the surgical standpoint, one of the most important effects of the presence of bile pigment and bile salts in the blood serum is their tendency to prolong the coagulation time of the blood. For this reason, accurate studies of the coagulation time of the blood are of primary importance in the determination of the jaundiced patient's tendency to bleed. Should the coagulation time of the blood be lengthened, measures directed to assist in shortening it are necessary.

The intravenous injection of calcium chloride, of transfusions of blood, or the intravenous injection of hypertonic solutions of glucose, all have served admirably to prevent postoperative bleeding, and have made it possible to extend the frontier of operability to include cases in which, years ago operation would have been denied for fear of fatal termination due to hemorrhage.

An interesting point about biliary obstruction is that whereas in some cases it may persist for weeks and months without much alteration of the coagulability of the blood or without noticeable effect on the fundamental physiologic process of parenchymatous tissue, in other cases similar obstruction may not only markedly prolong the coagulation time of the blood, but showing further evidences of disturbed physiologic processes of the blood vessels, it may cause the appearance of purpuric spots on the skin or even may give rise to evidence of hepatic or renal insufficiency. Why this difference in reaction occurs is not certain.

The early effect of obstruction of the biliary tract on the liver is the production of fatty infiltration. As the obstruction persists hydrohepatosis may occur. The dilatation of hydrohepatosis might be likened to that which occurs in the renal pelves and calices when obstruction to the ureters occurs. It is accurately illustrated in celloidin and corrosion specimens of obstructed biliary tracts made by Counseller and McIndoe. The more marked the degree of infection in the walls of the intrahepatic biliary ducts, the less the degree of such dilatation.

THE VALUE OF THE CLINICAL HISTORY AND EXAMINATION

It is almost a surgical axiom that the appearance of the patient and his feeling of well-being or of illness serve admirably as indexes of his general condition. In the history of the case, the character and duration of the jaundice, whether its appearance was preceded or accompanied by colic, and whether chills and fever had been associated with it, are extremely important evidences in favor of one or another type of obstructing lesion. The presence of a palpable gallbladder, if a patient has had painless, afebrile, jaundice, usually means that the biliary obstruction has been due to a lesion in the head of the pancreas, for had it been the result of infection in the gallbladder, or of stone in the common duct, the infection of the walls of the extrabiliary passages,

like that of the walls of the intrabiliary passages, would have limited the distensibility of the gallbladder. The presence of subcutaneous hemorrhages or purpuric spots usually means prolonged coagulation time and a tendency on the part of the patient to bleed abnormally. The nodular liver of metastatic carcinoma frequently will reveal itself to the palpating hand, and the presence of fluid in the abdomen, when associated with painless jaundice and unchanged color of the stools, leads to the conclusion that the obstruction is intrahepatic.

TESTS OF HEPATIC FUNCTION

Rowntree, Snell, Greene and I, in a study of various tests of hepatic function, both clinically and experimentally, arrived at the conclusion that the degree of hepatic injury in biliary obstruction cannot be measured by any functional test. The tests with phenoltetrachlorphthalein or phenoltetrabromphthalein are obscured by the presence of jaundice and by biliary obstruction, and cannot be relied on. The determination, however, of the curve of the bile pigments in the blood serum is of great significance. Whether one chooses to use the method of van den Bergh or the icteric index of Meulengrocht is probably a matter of personal preference. Successive determinations of the amount of bile pigment in the blood serum are of value. Whereas operation is undertaken with increased risk when the concentration of bile pigment in the serum is increased, the reverse is true when it is decreased. In the cases in which the concentration of bile pigment in the blood serum is decreasing, therefore, it is often wiser to let it reach its lowest level before instituting surgical treatment.

This probably is the proper place to direct attention to the fact that all laboratory procedures in the study of cases of obstructive jaundice serve their best purpose in establishing or confirming a clinical diagnosis, in warning of operative or postoperative complications which may be met or avoided by appropriate measures, and in indicating the risk of operation.

THE NECESSITY OF COMPLETE RELIEF OF BILIARY OBSTRUCTION

If the patient is to recover from an operation for obstructive jaundice, complete removal of the obstruction must be accomplished. This means that if stricture of the duct is present, one of several operations must be performed. Accurate anastomosis may be made between the ends of the duct after the stricture has been excised, or between the upper end of the duct, above the stricture, and the duodenum. If the stricture is too extensive to permit of such anastomosis, then an external biliary fistula must be established, later to be coned out and transplanted into the stomach or duodenum. If the obstruction is the result of a tumor in the head of the pancreas, anastomosis of the distended gallbladder to the stomach or duodenum should be made, and the stoma should be of sufficiently large size to prevent obstruction should edema and swelling occur at the site of the union. If a stone in the common or hepatic duct has been the cause of obstructive jaundice, it should be removed. If several stones are present, all should be removed. Failure of recovery in most instances, following operations on the biliary passages, has been proved at postmortem examination to have been the result of failure adequately to relieve the obstruction.

COMPLICATIONS FOLLOWING OPERATIONS

Clinical problems frequently arise in the course of study and treatment of cases of obstructive jaundice, the solutions of which in some instances may depend on detailed study of a larger number of similar cases, or, in others, on taking the problems into the experimental laboratory. Reference has been made to the method of joining that portion of a common or hepatic duct, above a stricture, to an opening made in the duodenum to relieve the biliary obstruction. The possibility of leakage of bile or of duodenal content from the line of anastomosis is apparent. In one case in which leakage did occur, and duodenal fistula resulted, study of the patient's blood revealed increase in the concentration of urea and decrease in that of chlorides. Explanation of this was obtained in the experimental laboratory by producing duodenal fistulas in animals. Here it was found that the increase in urea was a phenomenon of dehydration, the result of toxemia due to loss of fluid through the duodenal fistula, and that the decrease in blood chlorides was due principally to the loss of chlorides from the gastric secretion. Replacement of the fluids lost through the duodenal fistula served to overcome the toxemia, and especially was this true when physiologic sodium chloride solution was used, which also tended to re-

place the blood chlorides. The clinical application of solution of this problem is apparent, for by overcoming the toxemia from dehydration the fistula was allowed to heal spontaneously, without the danger and risk and difficulty of a second operation directed to closure of the fistulous opening.

In another case, leakage of bile sufficiently rotated the liver to interfere with circulation in the inferior vena cava and this resulted in grave symptoms of shock. Following the opening of the incision done in the patient's room, and the gush of bile from above the surface of the liver, marked improvement within a short time was striking.

Bollman and I, working on the problem presented by this case, found that by depressing the liver of an animal with a rubber glove which could be inflated, exactly similar changes in blood pressure, pulse, and respiratory rate occurred, and when the liver was allowed to return to its normal position, these symptoms disappeared as suddenly as they had disappeared in the case in which we effected egress of accumulated bile. Then later, when, in the same animals, instead of causing rotation of the liver, the circulation of the inferior vena cava was interfered with, with the same results, evidence seemed to point to the fact that the displacement and particularly the rotation of the liver, had by its interference with the circulation of the inferior vena cava, been the cause of our patient's postoperative complications. From the surgical standpoint, it is interesting that the patient with the duodenal fistula and the patient who had accumulation of bile displacing the liver, have been well for periods of five and four years, respectively, since operation.

It has been a common clinical impression that following operations on the common and hepatic bile ducts, if bile in normal amounts and of normal color was excreted each day, and if the patient's general condition appeared to be approximately normal, the liver was functioning satisfactorily. Similarly, it has been noted by some that if patients were not doing well following operation, there was paling and thinning of the bile. These clinical observations led us to describe, in 1922, what we termed "the clinical picture of hepatic insufficiency." Mention of this is made because this clinical observation led later to study of the constituents of bile which drained following operations on three groups of patients whose biliary obstructions were due respectively to stones, strictures, and tumors of the head of the pancreas.

The quantity of bile excreted, and the concentration of bile pigments, bile salts, chlorides, and urea in the bile, in each group differed markedly from those in every other group. Fewer abnormal changes occurred in the bile, if obstruction was intermittent and of short duration, in those cases in which the obstruction was due to stones in the common duct, and in which, therefore, little injury to the hepatic cells had occurred. Among the patients with carcinoma in the head of the pancreas, with continuously increasing obstruction of the common bile duct, was the greatest change in output and concentration of bile. We speculated on the cause and were led to believe that the tremendous increase in the amount of fluid discharged through the biliary passages, if there was obstruction of the pancreatic portion of the common bile duct, was due to increase in the surface area of the intrahepatic biliary passages previously mentioned.

These observations may be the explanation for the fact that in cases in which an external biliary fistula is made or cholecystostomy is performed for obstruction of the pancreatic portion of the common bile duct, within a short time the operation is followed by the development of dehydration toxemia due to loss of an abnormal amount of fluid and chlorides.

SUMMARY

I have attempted to call attention to a few of the interesting and important problems in the treatment of patients with obstructive jaundice. Special attention has been directed to the value of a carefully taken clinical history and to the advantages of general examination in arriving at a correct diagnosis, even of such complicated lesions as those which cause biliary obstructions and in which the accumulation in the blood of bile and its constituents are complicating factors.

In cases of obstructive jaundice, because of the indefiniteness of hepatic function and its determination, problems frequently will arise, which may be solved by studies of larger numbers of such cases. Still other problems may need to be taken to the experimental laboratory for solution.

Mention has been made of the opportunities for clinical investigation in this field only. Similar opportunities are present in all types of disease.

GRANULOCYTOPENIA, AGRANULOCYTIC ANGINA AND RELATED BLOOD DYSCRASIAS*

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This paper is a clinico-pathological discussion of a group of cases which showed marked diminution or absence of the granulocytic cells of the circulating blood. Most of these cases had a marked leukopenia and some or all of the clinical features described by Schultz in 1922[1] as the syndrome of agranulocytic angina. Schultz emphasized the following features: a sudden onset, usually in elderly women, with high fever and malaise, development of an ulcero-necrotic diphtheritic gangrenous process in the throat, frequently a slight jaundice, low total white cell and granulocytic (polymorphonuclear) cell counts, normal red blood cell and blood platelet counts, and a fatal termination.

Since 1922 a voluminous literature has appeared on this subject, some corroborative, but most of it controversial in character. Similar cases were described, some of which showed anemia and hemorrhagic diathesis or hemorrhagic diathesis alone; some had a gradual onset; others occurred in males, young women and children; some recovered, a number have had several attacks of the disease, with or without fatal termination. Other cases showed ulceration elsewhere than in the throat—in the esophagus, trachea, stomach, intestines, rectum, vagina and skin; some had no ulceration. Cases were reported with leukopenia, but normal percentages of polymorphonuclears; others had a leukocytosis or normal total white cell counts, but with low percentage of polymorphonuclears. Finally, it has been noted that similar blood or clinical pictures occurred, at times, in a variety of other conditions—benzol, arsenic and arsphenamine poisoning, following prolonged X-ray or radium irradiations, in acute and chronic aplastic anemias, in acute leukemia and aleukemic leukemia, in purpura hemorrhagica, in infection with B. melitensis, sepsis, sprue, infectious mononucleosis, catarrhal jaundice, influenza, sub-acute bacterial endocarditis, typhoid fever and miliary tuberculosis; in Hodgkin's disease and lymphoblastoma.

The clinical and pathological relation of some of these cases to agranulocytic angina is rather slight. Some show merely a leukopenia and granulocytopenia, others exhibit many of the clinical features described by Schultz. Where there is a definite picture of some other disease, such as subacute bacterial endocarditis, *plus* the features of agranulocytic angina, the tendency has been to ascribe an etiological rôle to the former. This is probable, but not proved.

Cases resembling classical agranulocytic angina in some, but not in all respects, occupy a debatable position. Many writers regard them as "variants," but others, including Schultz, insist that they are not true agranulocytic angina. All of this has led to considerable confusion in the literature and still greater confusion in the minds of practicing physicians. One physician has said, "Some men are diagnosing every case of sore throat with leukopenia as agranulocytic angina." Obviously, such a condition needs correction.

Rosenthal[2] has recently attempted a classification of the diseases which are associated with a leukopenia. He has dealt with these on the broad basis of extrinsic and intrinsic factors which regulate or influence the myeloid activity of the hematopoietic organs. Those factors which he enumerates are, the vegetative nervous system, infection, the acid base equilibrium of the body, endocrines and constitution. Doubtless other factors will be added to this list as our knowledge increases. Certain toxic agents, arsenic, and bismuth, arsphenamine, benzol, X-rays and radium might be considered as extrinsic factors which influence myeloid activity. Rosenthal's classification is as follows:

I. Fatal Agranulocytosis.
   a. Without anemia.
   b. With anemia.
   c. Malignant leukopenia.

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II. Benign Agranulocytosis (recovered cases).
III. Aplastic Myeloid Disorders.
  a. Acute aplastic anemia.
  b. Chronic aplastic anemia.
  c. Panmyelophthesis.
  d. Purpura hemorrhagica (with leukopenia).
IV. Leukopenic Leukemia.
V. Toxic Leukopenia or Aplastic Myeloid Disorders as a result of poisoning with Benzol, Radium and X-rays, Arsenic and Arsphenamine.
VI. Miscellaneous Cases (Nutritional Anemia, Chlorotic Anemia, Endocrine Disorders, Hepatitis, Obscure Infections, Idiopathic Leukopenias.

There is considerable to commend in this attempt at classification and much to condemn. The arbitrary limitation of the classification to those cases which are associated with a marked leukopenia, excludes a number of related diseases. A division of the cases into fatal agranulocytosis and benign agranulocytosis does not seem logical or warranted. Both fatal typhoid fever and typhoid fever with recovery are genuine typhoid fever. To be sure, all of Schultz's original five cases died, but likewise they were all women. With equal propriety one might insist on a subdivision of the cases into male agranulocytosis and female agranulocytosis. The term "agranucytosis" is somewhat objectionable. Literally, it means "without increase of granulocytic cells" and every normal person has agranulocytosis in this, its true sense. Granulocytopenia," meaning "a decrease in the number of granulocytic cells," is a better term.

Rosenthal further separates fatal agranulocytosis into three divisions: (a) without anemia, (b) with anemia, and (c) malignant leukopenia. The first of these is the syndrome of agranulocytic angina as described by Schultz. The second group differs from true Schultz agranulocytic angina only in the fact that there is an anemia and in some cases an additional thrombocytopenia. Frequently a definite cause can be ascribed to the accompanying anemia, such as menorrhagia, sepsis with suppurative embolic foci, etc., or it may exist prior to the onset. "Schultz did not accept such cases at first as agranulocytosis but later modified his views."[2,3] The authors feel that there is no real difference between these two groups of cases and that the anemia is more or less a complication. The third group of fatal agranulocytosis Rosenthal calls malignant neutropenia. These are cases of overwhelming sepsis in which there is a secondary anemia and marked leukopenia, but with a normal percentage of granulocytic cells and normal platelet counts. The clinical picture resembled that of agranulocytic angina, but with no ulceration of the mucous membranes. The authors reported a case[4] (No. 32 of this series), having fever, angina without ulceration, prostration, terminal broncho-pneumonia and a fatal termination. This case had but two white blood cell counts, both taken on the day of death, the one in the morning was 16,750 with no polymorphonuclears, that of the afternoon was 9,100 with no polymorphonuclears. There was a moderate anemia and a platelet count of 10,000. An autopsy showed little with the exception of a persistent thymus, terminal broncho-pneumonia and an aplastic bone marrow. There were no enlarged lymph nodes nor leukemic infiltrations of the tissues. Two other somewhat similar cases are included in this report (Nos. 34 and 35). The authors believe that these cases are closely related to those described by Schultz and suggested the term "Atypical Primary Granulocytopenia" for them.

It must be constantly borne in mind, however, that the human blood picture may change very rapidly. The authors have noted cases in which the total white cell count and the percentage of polymorphonuclears varied markedly within a few hours. Blood counts should be taken repeatedly; at least once a day—preferably at the same time, and more frequently when indicated. Furthermore, it is extremely difficult to obtain an accurate differential count on blood in which there are few white cells. *Diagnosis cannot be made solely on the blood picture.* Clinical findings, history and physical examination and the course of the illness; chemical studies of the blood; X-rays; biopsies when indicated and autopsy when possible, are also necessary.

Rosenthal's group of aplastic myeloid disorders seems to be a logical assembly, but includes several conditions which are rarely seen, and excludes a large group of aplastic anemias of which he has made a separate division, i. e., Group V, toxic leukopenia

or asplastic myeloid disorders. The authors can see no logical reason for this.

Leukopenic leukemia scarcely deserves a separate classification; most hematologists do not recognize it as a clinical entity, but rather regard it as a stage of myelocytic or lymphocytic leukemia. Furthermore, other leukemias sometimes exhibit a concomitant clinical picture of agranulocytic angina with high temperature, prostration and necrotic ulceration of the throat and other mucous surfaces (see Case No. 40). This group might well be labeled leukemia and include acute and chronic myelocytic leukemia and acute and chronic lymphatic leukemia. Rosenthal cites certain cases of aleukemic leukemia which at autopsy showed sclerotic or fatty changes in the hematopoietic organs, without the typical lesions of leukemia in the bone marrow or elsewhere. The authors have never seen cases of this sort but doubtless they occur. Clinically, they appear to be true leukemias in an aleukemic stage; the pathology is that of a degenerative aplastic myeloid disorder. They would provide interesting argument at any clinicopathological conference. More of these cases should be studied before they can be definitely classified. They may shed light upon the disputed etiology of the leukemias.

Rosenthal's fifth group is that of toxic leukopenia due to poisoning with benzol, radium and X-ray, arsenic and arsphenamine. This group will probably be extended from time to time. One of the cases of the present series (No. 38) occurred in a patient having hypertrophic arthritis of the left knee and both hip joints. Before the onset of the granulocytopenia she received vigorous treatment for her arthritis. The drug used was mono-iodo-cinchophen (Farrastan). It was given orally for several weeks in dosages somewhat in excess of those recommended by the manufacturers of the drug. She developed a typical clinical and blood picture of agranulocytic angina, but improved and eventually recovered when the drug was withheld. She has been well ever since. The authors are of the opinion that her response to withdrawal of the drug and her ultimate complete recovery argue somewhat for a drug poisoning as a basis of the illness. The drug Farrastan is being used extensively and, should the authors' opinion be well founded, other, similar cases will likely be observed.

A. Meyer[5] recently noted agranulocytosis occurring in cases of neuro-syphilis following a therapeutic inoculation with malaria. "In the first patient, who finally recovered, the causal relation between malaria and agranulocytosis is probable, but not absolutely sure. The second patient died and in this case there was no doubt that the malaria inoculation had caused agranulocytosis. In the literature on natural malaria the author did not find remarks about agranulocytosis as a complication of malaria. He also mentions that agranulocytosis was not observed in other patients who had been inoculated with the same malarial stock. Meyer asserts that he had noted agranulocytosis in several syphilitic patients. It developed mainly after treatment with arsenic or bismuth."

The etiology of the granulocytopenia, in these cases, is not clear; but recent arsenic and bismuth poisoning can be excluded. The patients had both lues and malaria; neither one, alone, has been known to produce the blood and/or clinical picture of agranulocytic angina. The favorable results of malarial treatment in neurosyphilis are commonly ascribed to the thermal changes induced by the treatment. The role of a thermal etiological agent is suggested but not proved. But leukopenia and granulocytopenia are never seen in other conditions in which there are marked thermal changes, as in brass poisoning or heat prostration. It seems most likely that the etiological agency, in these cases, is the overwhelming infection of both syphilis and malaria.

Other toxic substances may also cause leukopenia or granulocytopenia.[6,7]

Finally, Rosenthal has a group of miscellaneous cases which showed some degree of leukopenia with or without the clinical features of agranulocytic angina. The majority of these cases have few of the clinical features which might cause confusion with agranulocytic angina but they are doubtless related conditions.

Sweeney[8] has recently suggested a simple classification of cases showing polymorphonuclear leukopenia on the basis of their etiology or apparent etiology:

1. Infectious polymorphonuclear leukopenia.
2. Toxic or chemical polymorphonuclear leukopenia.
3. Idiopathic polymorphonuclear leukopenia.

This excellent classification suffers only in being too inadequate and incomplete to cover all known related conditions.

AUTHORS' CLASSIFICATION

The authors submit the following classification of cases of granulocytopenia:

I. *Typical Primary Granulocytopenia* (without anemia, with anemia and/or thrombocytopenia, with multiple attacks, recovered cases).

II. *Atypical Primary Granulocytopenia* (malignant leukopenia of Rosenthal, benign leukopenia, granulocytopenia without leukopenia).

III. *Secondary and Symptomatic Granulocytopenia*

- A. Aplastic Myeloid Disorders.
  1. Acute aplastic anemia.
     - a. Primary (relatively rare).
     - b. Secondary (as a result of poisoning with arsenic, arsphenamine, benzol, bismuth, trinitrotoluol, thorium X, radium and its salts, gold salts, monoiodo-cinchophen (Farrastan), X-rays. As a result of overwhelming infections, osteomyelitis, sepsis, miliary tuberculosis, malarial treatment of C. N. S. syphilis, etc.).
  2. Chronic aplastic anemia.
  3. Panmyelophthisis.
  4. Purpura hemorrhagica (with leukopenia).
- B. Leukemias.
  1. Acute and chronic myelocytic leukemia.
  2. Acute and chronic lymphocytic leukemia.
  3. Aleukemic leukemia.
- C. Miscellaneous.

The first and second groups are composed of cases having no obvious etiology. It is true that some of these have concomitant infection such as acute upper respiratory infections, peritonsillary abscess, cervical abscess, and bacteremia. However, most of these infections appear to be too minor in character to cause the profound changes which occur in the hematopoietic tissues. Many of these infections are definitely preceded by the appearance of the leukopenia and granulocytopenia. As to the fact that they sometimes preceded the onset of the blood picture, Sweeney's observation[8] that there may be a qualitative change in the leukocytes before there is a quantitative change, seems apropos. The polymorphonuclear leukocytes constitute the first line of defense to infections. When the leukocytes are depleted in numbers or impaired in function the general resistance of the body is greatly reduced to pathogenic organisms which, like the poor, are always with us. The authors believe that these cases are primary in the sense that no obvious, adequate bacterial or other etiology has been demonstrated.

The first group of cases showed blood and clinical findings which are quite like those which Schultz described as agranulocytic angina. Features which the authors have felt to be non-essential to this picture are age; sex; type of onset; presence or absence of anemia, thrombocytopenia and throat ulceration; and the result—in death or recovery.

The third group of cases showed the picture of agranulocytic angina in whole or in part, during the course of some other clinical disease entity which might be regarded as the causative agent.

That there may be little or no pathological difference between certain selected cases from each of the three groups, is freely admitted by the authors. The classification is intended primarily for the use of clinicians and the authors are of the opinion that it is simple, workable and in keeping with present clinical and pathological knowledge.

CASE REPORTS*

All of the cases reported in this paper have a local flavor. Nearly all of the patients are, or were, residents of Detroit and its environs. All were seen by local physicians during or following their illness. This wealth of material, largely from a single locality, was adaptable to certain types of study which ordinarily is not possible. An attempt was made, so far as possible, to include all of the local cases of agranulo-

*The authors wish to thank the following physicians for permission to use their records of cases: Drs. F. G. Buesser, W. J. Cassidy, P. Clifford, T. Cooley, A. S. DeWitt, R. L. Fisher, G. A. Ford, W. L. Foster, H. Freund, J. Gordon, W. H. Gordon, D. Gutakunst, J. D. Hayes, W. Henderson, F. D. Jackson, C. G. Jennings, L. G. Jentgen, R. L. McAlpine, R. D. McKenzie, R. K. Miller, C. I. Owen, P. Morse, E. J. Panzner, J. M. Robb, H. Schmidt, F. J. Sladen, E. D. Spalding, J. T. Watkins, N. J. Whalen, and W. Willson, of Detroit, Michigan; also Dr. S. W. Lambert, of New York City.

cytic angina. Some cases, undoubtedly, were missed; a few had to be excluded because of incomplete or unconvincing records. A criticism of office and hospital records is not intended as a part of this paper, but there was considerable variation in the quality and completeness of the clinical and laboratory studies which were made upon these cases.

Fourteen of these cases have been previously reported,[4, 9, 10, 11, 12, 13] some of them in rather obscure and inaccessible publications so that their inclusion in this paper seems justified.

The single leukocyte and differential counts in the tables are the lowest counts noted on each patient. Where several counts appear for a single case, each count is the lowest obtained during a separate and more or less definite attack of granulocytopenia. The hemoglobin percentages and red blood cell counts were taken at the same, or approximately the same, time as the leukocyte counts. Platelet counts, unfortunately, were made on only a few of the cases so that no column has been provided for them in the tables.

It is obviously impossible to give an accurate idea of the type and range of fever during the course of an illness, by a single figure. The temperature stated for each case is a mean or average during the acute phase of the granulocytopenia.

I. TYPICAL PRIMARY GRANULOCYTOPENIA

The authors have nothing new to present as an explanation of the etiology of primary granulocytopenia. Certain well known facts have a bearing on this matter. It may be assumed, in cases of primary granulocytopenia, that there is an intrinsic constitutional hypoplasia or a destruction by a toxin of unknown origin, of the myeloid tissues. Few leukocytes are manufactured and those circulating in the blood stream soon pass their normal span of life and die. The result is a leukopenia. Reduction in the number of polymorphonuclear cells is more rapid than the reduction of lymphocytes for some unknown reason. Perhaps the toxin has a selective action upon the parent cells of the granulocytic cells or their parent tissues are more hypoplastic than the lymphoblastic tissues. In either event a marked granulocytopenia occurs.

As a result the defense mechanism of the body against infection is markedly impaired. Polymorphonuclear leukocytes, the most active phagocytizing tissues of the body, are nearly or completely absent. Certain other defense systems are also damaged or depleted. Leukocytes contain substances which are strongly bactericidal, called endolysins. These substances act independent of the blood serum and resemble the enzymes in many respects.[14] These endolysins probably act on both free and phagocytized bacteria. Lymphocytes and macrophages appear to be devoid of this endolysin.[15] It has been shown experimentally[7] that rabbits having severe leukopenia apparently have no antibacterial bodies present and that bacteria grow in their tissues in enormous numbers. When the leukocyte count of rabbits is less than 1,000 the animals cannot produce pus in response to inflammation.

In the human body the result of the leukopenia and granulocytopenia is infection. Pathogenic bacteria, normally present on the various mucous surfaces, grow luxuriantly, invade the tissues causing necrosis and ulceration, enter the blood stream causing sepsis, cause severe toxemia, high fever, prostration and frequently death.

Thirty-one cases are included in Table I. There were 21 females (68 per cent) and 10 males (32 per cent). The average age was 42.5 years. Females averaged about 4 years older than males.

In 19 instances the onset was gradual, in 6 it was fairly sudden, in 11 it was sudden. The average total duration of illness was about 13 days, the average duration of acute illness was about 7.5 days. These figures are only approximate and do not include the long prodromal stages, which were noted in a few cases, nor the protracted periods of convalescence of the recovered cases.

All of these patients had definitely elevated temperatures. Several showed a septic swing of the temperature curve during each day of their acute illness, but this was not observed as frequently as was a sustained high fever.

All of the cases showed a marked leukopenia and granulocytopenia. The average of the lowest recorded total white cell counts was about 1,100 cells per cubic millimeter. The average percentage of polymorphonuclear cells was about 4.7. Eleven of the cases had hemoglobin percentages less than 70; on six of the cases the hemoglobin percentage and red blood cell counts were not

TABLE I. TYPICAL PRIMARY GRANULOCYTOPENIA

Case	Sex	Age	Type of Onset	Duration in Days		Temperature	Leukocytes	Polymorphonuclear	Lymphocytes	Mononuclears	Myelocytes	Wassermann	Hemoglobin	R.B.C. in Mill.	Blood cultures	Location of Necrosis	T. Pneumonia	Death or Recovery	Autopsy
				Total	Acute														
1	F	36	Gradual	26	5	104°	300	0	100			++++	50	3.14	Not Done	Pharynx Vagina	+	D	—
2	F	66	Gradual	?	6	104°	500	0	100			—	70	3.49	Not Done	Pharynx Stomach Small and large intestines Rectum Vagina	—	D	+
				16	4	103°	1,100	8	82	10			85	4.70					
				?	19		800	2	70	26	4		65	3.78					
3	F	33	Gradual	?	6		1,550	21	79			—	100	5.04	Not Done	Angina, but no necrosis	—	R	—
4	M	55	Gradual	7	4	102°	1,800	0	62	38		—	70	3.23	Not Done	Pharynx	—	D	+
5	F	24	Gradual	21	11	103.4°	600	0	100				86	4.45	No Growth	Pharynx ?Intestines	—	R	—
6	M	21	Sudden	7	7	103.6°	560	0	100				60	2.36	No Growth	Pharynx Tongue Intestines	+	D	+
7	M	35	Gradual	16	5	104°	1,200	0	100				74	4.26	No Growth	Pharynx	—	D	—
8	F	54	Sudden	4	4	102°	180	0	100						Pneumococci	Pharynx Intestines Vagina	—	D	+
9	F	45	Sudden	8	8	105°	250	2	98				45	2.14	Strep. hem. Strep. vir.	Pharynx	+	D	+
10	M	42	Gradual	20	5	103.4°	250	0	60	40			100	5.00	Not Done	Gums	+	D	—
				?	6	101.6°	1,600	0	100								?		
11	F	44	Gradual	?	3	100°	950	0	88	12		—			No Growth	Pharynx None	—	R	—
12	M	57	Gradual	?	5	103°	1,400	0	100				90	4.40	Not Done	Angina, but no necrosis	—	D	—
13	F	67	Fairly Sudden	11	9	104°	450	1	99				87	3.18	Not Done	Pharynx Cheek	+	D	—
14	F	57	Fairly Sudden	9	6	104°	720	3	97			—		4.48	Not Done	Soft palate	+	D	—
15	M	56	Gradual	?	7	105°	990	19	71.5	7	1.5		85	4.39	Not Done	Angina but no necrosis	—	R	—
			Gradual	11	5	101°	3,600	4	72	24			80	3.88	Not Done	No necrosis	—		
16	F	40	Sudden	5	5	101°	800	0	95	5		—			Not Done	Skin over sternum	?	D	—
17	F	48	Fairly Sudden	13	8	103.5°	860	0	93	7						Pharynx Palate			

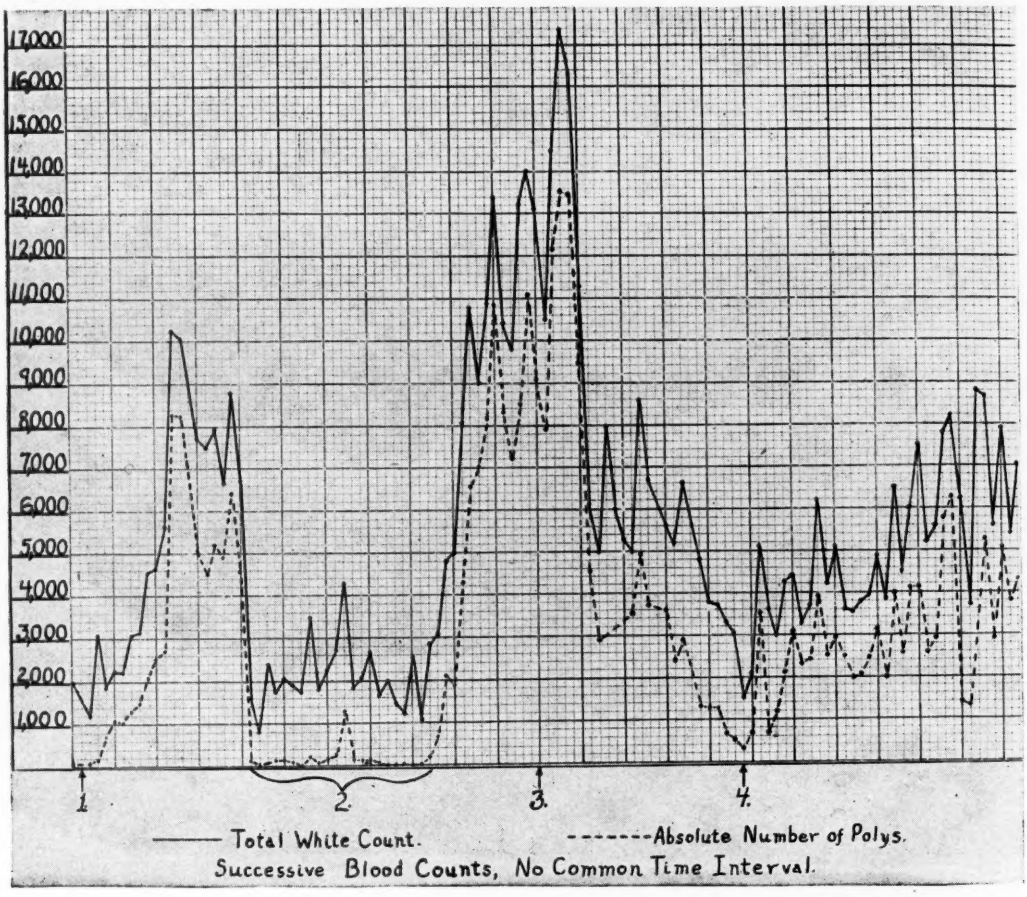
16	F	40	Sudden	5	5	101°	800	0	95	5		—			Not Done	Skin over sternum	?	D	—
17	F	48	Fairly Sudden	13	8	103.5°	860	0	98	2			80	4.04	Not Done	Pharynx Palate Naso-pharynx	+	D	—
			Gradual	?	7	99°	2,440	16	84				82	3.73		Peri-tonsillar abscess	—		
18	F	45	Sudden	9	7	101°	675	0	100			-	65	3.55	Not Done	Soft Palate	+	D	+
19	M	30	Fairly Sudden	10	8	105°	760	0	92	8			90	4.62	Not Done	Pharynx	—	D	—
20	F	54	Sudden	3	3	102.5°	500	0	100						Not Done	Soft Palate Gums	+	D	—
21	M	22	Gradual	?	App. 30	102.5°	1,640	4	96			—	60	3.15	Not Done	Pharynx Tonsil Soft Palate	—	R	—
22	F	34	Sudden	30	20	103°	3,300	8	84	8		—	50	3.66	Not Done	Pharynx Tonsil Labia Majora	—	R	—
				?	3	102°	2,850	7	90	3			75	3.84	No Growth	Base of Tongue	—		
23	M	58	Gradual	?	7	103°	1,500	6	56	35	3		60	3.44	Staph. Aureus.	No Necrosis	—	R	—
			Gradual	21	9	103°	800	2	96	2			70	3.81	No Growth	Soft Palate Base of Tongue Soft Palate	—		
24	F	39	Sudden	9	9	104°	950	0	77	23			60	3.69	Not Done	Base of Tongue Oral Margin	—	D	+
25	M	21	Gradual	34	9	104°	2,900	2	90	5	3	—	36	1.37	Not Done	Pharynx Naso-pharynx Tonsil Soft Palate	+	D	—
26	F	42	Sudden	8	8	103°	200	0	10	90		—	82		Gram and streptococci Diphtheroids	Peri-tonsillar Abscess	+	D	—
27	F	44	Fairly Sudden	11	5	104.5°	1,600	3	96	1			60	2.47	Not Done	Pharynx Skin of Body	+	D	+
28	F	45	Fairly Sudden	6	2	102°	840								Strep. hem. Staphylococci Gram and diplococci	Pharynx Skin of Body	+	D	+
29	F	37	Fairly Sudden	13	10	103°	300	0	100						Not Done	Pharynx	—	D	—
				23	4	104°	760	3	97				52	3.07	Not Done	Gums Oral Mucous Membrane	—		
30	F	28	Sudden	7	2	102°	1,000	69	31			—	70	4.04	Not Done	No Necrosis	—	R	—
31	F	40	Sudden	9	5	104°	300	0	100			++++	85	4.64	No Growth	Soft Palate	—	D	—

determined. Only two of the cases (Nos. 1 and 9) showed definite evidence of hemorrhagic diathesis in the form of low platelet counts and petechial hemorrhages. Platelet counts, however, were made on very few of the cases. Thrombocytopenia was probably present, but undetected, in a number of other cases of the series.

Seven cases (22.5 per cent) showed clinical jaundice.

Blood cultures were taken in twelve instances. Positive blood cultures were obtained on five cases. The organisms found in the cultures were, pneumococci, streptococcus hemolyticus, streptococcus viridans, other streptococci, staphylococcus albus, gram-positive diplococci and diphtheroids. Several cases showed a mixture of organisms. If blood cultures had been made on each case, it is probable that a larger number of positive cultures would have been obtained.

Throat cultures were taken on 17 of the cases. None of the throat cultures were positive for Klebs-Loeffler bacilli. All sorts of organisms were recovered in the throat cultures, as might be expected. Rarely were the same bacteria recovered in throat cultures and blood cultures from the same patient. Throat cultures to exclude the diagnosis of diphtheria are valuable, but the identification of other types of organisms in throat cultures has little practical significance for diagnosis, prognosis or treatment.

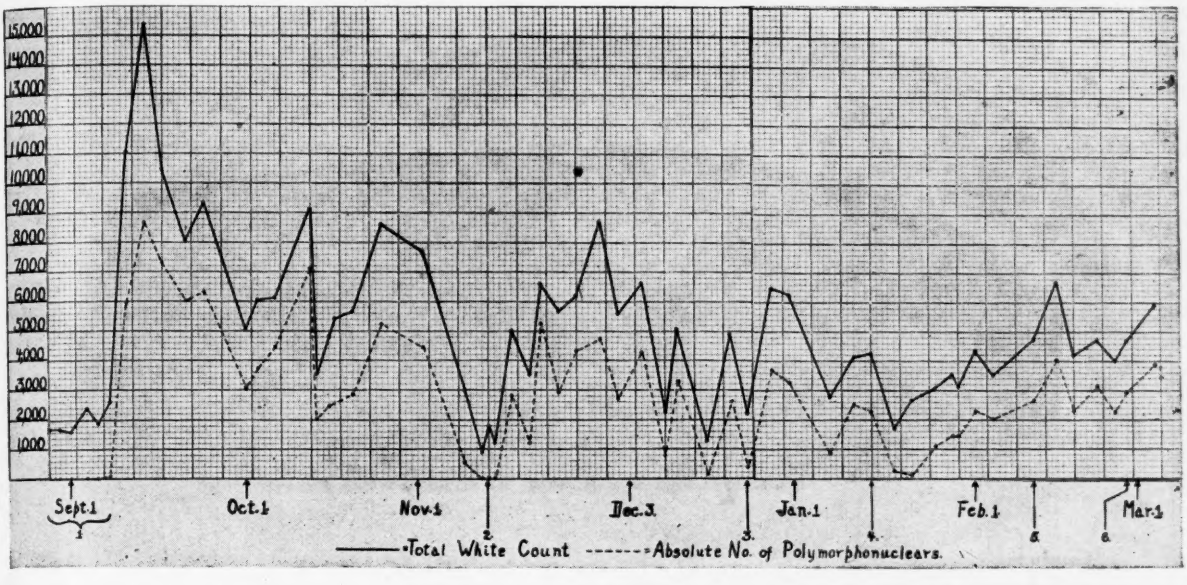


Graph I. Case No. 2. This patient has had three attacks of granulocytopenia indicated on the graph at points 1, 2 and 4. At point 3 a sterile fixation abscess was obtained in the hip by injections of turpentine. The response to this inflammation was a normal leukocytosis. The patient has been kept under observation during the past 18 months since her first attack and at present is in fairly good general health.

Throat smears were taken on 13 cases. Eleven of these were positive for Vincent's organisms. This is a high incidence of positive smears. The authors are of the opinion that a careful search for Vincent's organisms by means of Gram's or Giemsa's stained smears would give positive results on almost every case of granulocytopenia having ulcero-necrotic throat lesions.

In all but 9 instances there were necrotic-ulcerative lesions in the mouth or throat. Three of these cases showed tvpical necro-

ses at the time of other attacks of granulocytopenia. Autopsy studies frequently revealed numerous ulcerations which had not been noted or suspected during the illness of the patient. Four of the cases showed



Graph II. Case No. 11. This patient has had two attacks of granulocytopenia, indicated on the graph at points 1 and 2. At the times indicated by points 3, 4 and 5, the patient was menstruating. There does not appear to be any definite relation between the menstrual cycle and the elevation or depression of the total leukocyte or absolute polymorphonuclear counts. At point 6 the patient was recovering from a moderately severe head cold of 5 days duration. She is no longer under close medical observation but is said to be in excellent health at the present time, nearly three years since her first attack.

ulceration of cutaneous surfaces. Dr. John Gordon has made a study of these lesions and will publish full case histories and descriptions of cases 27 and 28.[13]

Thirteen of the cases showed a bronchopneumonia; in a few instances this was only diagnosed at autopsy. Only eight of the cases recovered, a mortality rate of 74.2 per cent. Autopsies were performed on 9 of the cases.

It is rather curious to note that many of these patients were members of the medical and allied professions, or were relatives of physicians. Cases 5 and 30 were nurses. Case 15 is a physician and case 23 is a dentist. Case 11 was a sister-in-law of a physician, case 12 the father of a physician, and case 13 the mother of a physician. Case 17 was the daughter of a physician, her husband is a physician and she has a brother who is a physician. Case 20 was a mother-in-law of a physician, case 24 a housekeeper for a physician and case 25 was the distant relative of a physician. Case 32 of Table II was a physician.

No comment seems to have been made in the literature on this curious relation. In a recent article Harkins[16] reported 8 cases of granulocytopenia of which one was a physician, one a nurse and one a medical student. It is trite, but doubtless true, that better diagnosis has played some part in the recognition of these cases and has caused an apparent relation. The hazard of frequent contact with infection may be a factor.

The social status of these patients was given some consideration. Very few of the cases occurred among the poorer classes. Receiving Hospital, a large hospital maintained by the City of Detroit for the poor, and having an excellent staff of alert, well-read physicians, has no record of any cases of primary granulocytopenia. At least 9 of the patients in Table I are extremely well-to-do. Locally the disease is most common among the people of the better classes.

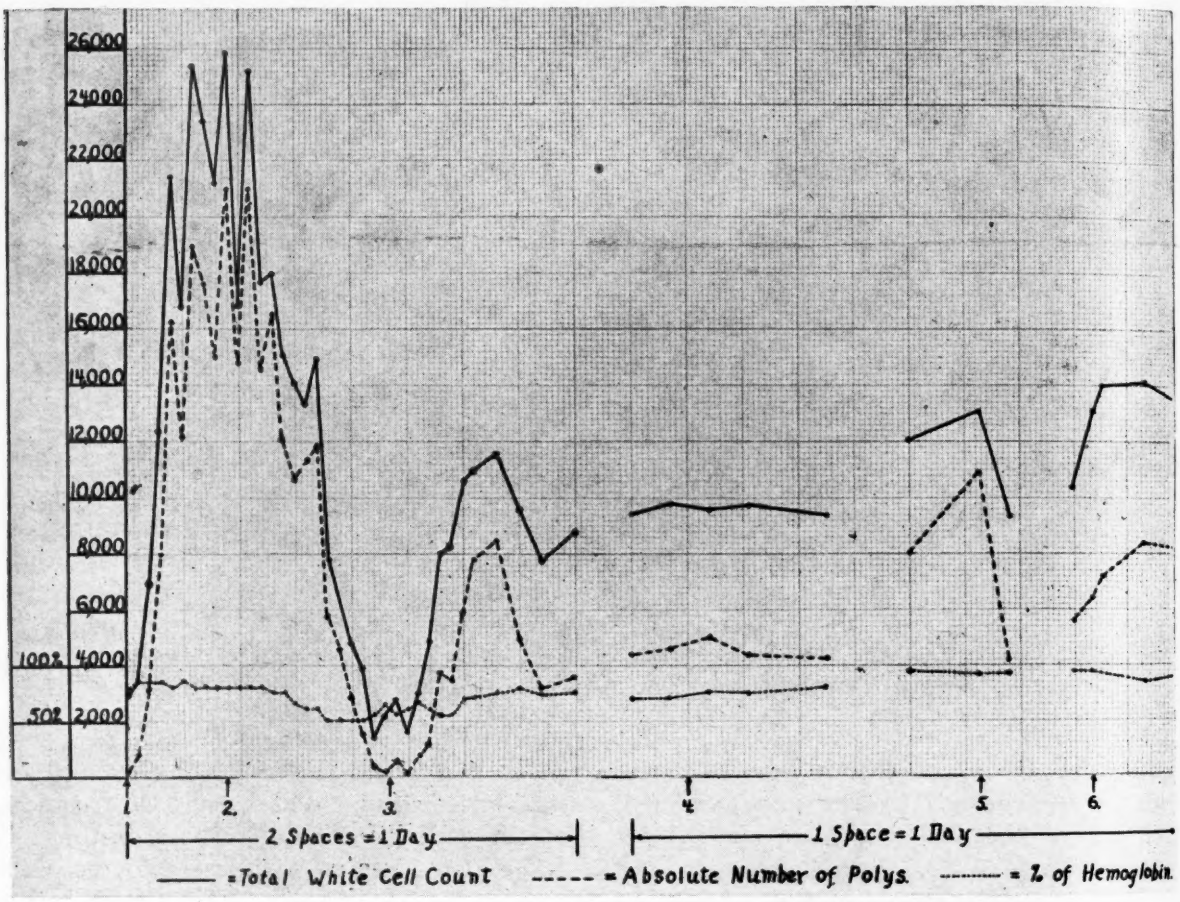
None of the cases occurred in negroes, although Detroit has a large colored population. So far as the authors are aware there have been no cases of primary granulocytopenia reported in the literature among negroes. Wheelihan[17] reported a case of secondary granulocytopenia in an 8 year old negro girl. This case developed during the course of sulpharsphenamine treatment of congenital lues.

The addresses of most of the patients of Table I were obtained and compared with a map of the City of Detroit. No definite

epidemiological relation or evidence of contact was discovered by this means. The patients were scattered throughout the city and its suburbs. None of the patients were blood relatives. The only point which seemed to favor contact, family or geographical relation of the cases was noted in cases 20 and 38. The husbands of these two patients were brothers, the two families lived near each other and were intimate socially. However, an interval of six months separated their illnesses and the granulocytopenia of case 38 was possibly caused by the toxicity of a drug.

The occurrence of the cases by month and year is given in Table II. No marked seasonal variation was observed, but the disease appears to be less common in the summer months than at other times of the year.

The past histories of these patients were carefully analyzed for evidence of past illnesses which might have some bearing upon the etiology of the granulocytopenia. Twenty of the cases (64.5 per cent) had chronic or recurrent acute attacks of upper respiratory disease such as frequent head colds, frequent attacks of acute tonsillitis, frequent or chronic otitis media, peritonsillar abscess and accessory nasal sinus disease. Six cases gave definite past history of gall bladder disease. Three had past histories of fairly recent bone fracture. Previous chronic arthritis was noted in three cases. Two cases reported the recent removal of teeth.



Graph III. Case No. 23. This patient has had two attacks of granulocytopenia indicated on the graph at points 1 and 3. Two months previous to the first attack he had a typical attack of lobar pneumonia. During his convalescence from pneumonia a blood count was taken which showed W.B.C. 12,500. polymorphonuclears 72%, hgb. 75%, R.B.C. 3,710,000. At point 2 on the graph the patient reacted with a normal leukocytosis to a cervical abscess which followed his first attack of granulocytopenia. Staphylococcus albus was recovered by culturing the pus from the abscess and the same organism was recovered from the blood stream during the second attack. At point 4 the patient suffered a very painful phlebitis of the left lower extremity which persisted in gradually decreasing severity for several months. At point 5 the patient was recovering from a moderately severe cold of 14 days duration. At point 6 the patient had a root abscess and the tooth was extracted; at this time there was a marked Vincent's infection of the surrounding gums. The leukocytic response to each of these three infections was essentially normal. Repeated blood counts taken during the intervals shown on the graph were also normal. The patient is still under observation and in good health, more than two years after his first attack.

PROGNOSIS

The mortality rate for the 31 cases is 74.2

TABLE II. INCIDENCE OF CASES IN TABLE I BY MONTH AND YEAR

	1913	1926	1927	1928	1929	1930	Totals
Jan.						3.[2]7.17.30[1]	4.
Feb.					12.	18.[2]	2.
March			24.[2]		23.[1]	3.[3]26	4.
April			21.		22.23[2]	27.	4.
May				4.		20.	2.
June					2.	10.	2.
July		25.					1.
Aug.	29.			8.11[1]		14.	4.
Sept.						30.[2]31.	2.
Oct.		16.[1]*		1.19			3.
Nov.				11.[2]	3.[1]5	9.	4.
Dec.		16.[2]*24[1]	6.18[1]		13.15	28.	7.
Totals	1.	4.	4.	6.	9.	15.	39.

*Two attacks of granulocytopenia in the same patient.

per cent. It is approximately the same for the two sexes (70 per cent males, 76 per cent females). The average age of fatal cases was, for females 47 years, and for males 37 years.

There have been numerous attempts to establish some criteria which would be useful in giving a prognosis in these cases. A few years ago Watkins[12] postulated that patients showing a total white count of more than 1,000 cells per cubic millimeter would usually recover, while patients having counts lower than 1,000 would usually die. Rosenthal[2] believes that the blood picture of recovered cases is usually higher than that of fatal cases. In his series of cases three fatal cases showed white counts higher than 1,000 and only one recovered case showed a count of less than 1,000. In the authors' series, five cases (Nos. 3, 5, 11, 15 and 30) had counts of less than 1,000 but recovered, while five cases (Nos. 4, 7, 12, 25 and 27) had counts higher than 1,000 with fatal termination.

It is true, however, that the tendency in fatal cases is to lower counts and lower percentages of polymorphonuclears. In the authors' series of cases the average of the lowest recorded total white cell counts during attacks of granulocytopenia from which the patients recovered was 1,590 with an average of 10.5 per cent of polymorphonuclear cells. The average of the lowest recorded total white cell counts during fatal attacks of the illness was 795 cells per cubic millimeter with an average of less than 1 per cent of polymorphonuclear cells.

Most of the cases showing small percentages of myelocytes in the differential counts have recovered. This is not a wholly reliable rule. Age and sex do not seem to influence the prognosis. There is little difference between the average age of the recovered and the fatal cases and the mortality rate for the two sexes is practically the same.

All of the cases in the authors' series which showed definite signs of bronchopneumonia had a fatal termination. This may be a reliable sign of poor prognosis. All of the cases having cutaneous ulceration likewise died. Of the five cases which showed positive blood cultures, all died but one.

TREATMENT

Many forms of therapy have been tried, none of them with marked success. Some of the drugs and forms of therapy which have been used locally are: intravenous injections of typhoid vaccine or arsphenamine; intramuscular injections of vaccines,

nucleinic acid and leukocytic extract; oral administration of iron, arsenic, liver and liver extracts; X-ray irradiations of the long bones and spleen; sterile fixation abscesses produced by injections of turpentine; blood transfusions from ordinary donors and from patients who have recovered from the disease.

In most of the local cases several forms of therapy were given simultaneously so that it is almost impossible to determine the independent value of a given form of treatment. It should be remembered that spontaneous recovery may occur without treatment or in spite of treatment. Case 21 was diagnosed as agranulocytic angina in a local hospital, a fatal prognosis was given, but, at the request of his wife, he was discharged so that he might die at home. He did not have a physician attending him at his home and received no medication. He spontaneously recovered from his illness and is in excellent health at the present time. Blood from this patient was given to case 5 and the patient recovered.[10] Since that time blood from the same patient has been given to cases 10 and 13 but without favorable result. Harkins[16] reported a case successfully treated by immune blood transfusions.

The authors believe that hospitalization, good nursing, supportive and symptomatic treatment will give as good results as any other forms of therapy.

CASE REPORT

One of the cases (No. 16) presents a number of very unusual features. Drs. J. M. Robb and R. K. Miller have granted the authors permission to report the case in detail.[18]

Mrs. C., 40 years old, was born in Poland, came to the United States at the age of six years. She returned to Poland in 1923, and came to the United States again in October, 1926. Both her personal and her family histories were negative so far as her latest illness was concerned.

The patient dated the onset of her illness as September, 1924, for she had not enjoyed perfect health since that time. She had just been delivered of her youngest child. The puerperium was normal, except that a mild jaundice was noticed, lasting a week. However, the patient had been weak ever since the delivery. She had slept poorly. She had been subject to night sweats and had lacked her usual energy.

In June, 1925, she had an attack of inflammation of one eye that made her feel sick for three weeks. Her condition was not changed except for an attack in May, 1926, of severe sore throat with chills, fever. After five days without relief she consulted a physician, who discovered numerous ulcers in her mouth. The ulcers healed rapidly and the patient felt cured until a week or so later when she had a second attack with similar recovery. These attacks were repeated with increased severity until August. Her general condition was so poor that on several occasions she was not expected to live. The attacks always started with a soreness in the tonsillar region, chills and fever. The superficial ulcerations developed about the fourth or fifth day of the attack and healed rapidly without scarring. With one attack, she developed the same kind of ulcer on the lower aspect of the left breast. With this exception, the ulcerations were confined to the mouth. The smears from the ulcers showed Vincent's organisms. The Wassermann was reported negative. One physician treated the patient for foot and mouth disease.

During August, 1926, she was free from attacks. In September she developed an abscess, which healed normally, in the left side of the neck. Later in the month she had a recurrent attack of sore throat and stomatitis which healed rapidly. In October, 1926, she sailed for America. On the way over, she had the premonitory symptoms of fever, chills and sore throat. The ulcerations, however, did not appear. Arthritis in the right wrist developed instead, which lasted only a few days, but left an ankylosed wrist joint. The soreness of the throat returned and the patient entered the hospital soon after reaching Detroit.

Physical examination showed among other things the skin to be dry and of a faint icteric tint, over the face, suggestive of myxedema. The nose had a crusted condition of chronic nasal catarrh, most marked on the nasal septum, which deviated to the right side. By transillumination, both antra were more cloudy than normal, but both frontal sinuses were clear. There was some swelling over the left temporo-mandibular joint and marked tenderness on moving the jaw. The teeth were clean, showing no pyorrhea. Several had been extracted. The tongue appeared smooth but atrophic along the margin. In the center of the tongue there was a small elevated, erythematous, tender papule. On the inner surface of the lower lip, there was a discrete oval greyish scar that resembled a canker sore, except that it was not tender. The pillars of the tonsils were injected and swollen; the tonsils were completely buried. Miliary papules were seen on the anterior pillar of the left tonsil. The neck contained small discrete palpable glands, that were tender. There was a scar well healed in the lower portion of the left side of the neck.

While in the hospital, November 3, 1926, the patient developed a polyarthritis involving the left

BLOOD COUNTS

Date	Temp.	Pulse	Hgb.	R.B.C.	W.B.C.	Polys.	Lymph.	L.M.	Eos.	Bas.
10/29/26	101⁴				4,000	0	95%	2%	2%	1%
10/31/26	100⁴	88	80%	3,880,000	3,600	4%	72%	24%		
11/ 5/26	100	92			3,100	55%	39%	6%		
11/ 7/26	98	80	75%	4,500,000	2,500	52%	40%	6%	1%	1%
11/14/26	97⁸	80			4,500	64%	31%	5%		
12/ 5/26					4,600	59%	37%	4%		
12/22/26	101⁸	100			1,500	0	88%	12%		
12/24/26	100⁶	120			800	0	95%	5%		

temporo-mandibular joint, the right wrist and elbow, both knees and the joints of the left hand and foot. The afflicted joints showed pain, tenderness, heat, swelling and redness. She was put on salicylate therapy but the recovery from the arthritis was very slow. November 11, 1926, her tonsils were removed under local anesthesia. The tonsillar fossæ healed with no more than the usual reaction. When she was discharged from the hospital, November 14, 1926, she seemed on her way to complete recovery.

December 5, 1926, the patient was seen in her home. She was feeling greatly improved, but the arthritis still confined her to bed. She had lost about twenty pounds in weight. When seen December 12, 1926, she was able to walk a little, but had not completely recovered. December 14, 1926, the patient developed an acute head cold with nasal obstruction and nasal discharge. December 15 she had chills and fever of 104° F. The following day grouped vesicles, which caused unpleasant itching, appeared in the midline over the upper part of the sternum. These vesicles ruptured spontaneously, leaving superficial ulcers. December 20, 1926, the right side of the face became swollen, firm and slightly tender.

The patient was examined December 22, 1926. The lymph glands in the upper right side of the neck were swollen, firm, not very tender, and the skin over this area was tense and brawny. There was no fluctuation present. There was a single pustule of millet seed size in front of the right ear, and another pustule on the forehead. The anterior nares were swollen, red and tender. There was a superficial ulcer on the upper lip. The mouth was free from lesions. The tonsillar fossæ were clean, showing no pathology. Over the middle third of the sternum was an ulcer about the size of the palm of a man's hand. It was superficial with a distinct serpiginous slightly elevated margin and a dirty base. There seemed to be no reaction to the ulcer by the surrounding tissue. The condition remained unchanged for the following two days. The patient complained of being unable to rest. Examination of the heart and lungs revealed no pathology in the chest. The cervical glands showed no tendency to break down or disappear. In the posterior axillary fold on the left side was a smooth swelling. This had the consistency of a lipoma. The axillary glands were not swollen. The presternal ulcer remained unchanged.

The patient became rather acutely dyspneic about 9:00 a. m., December 24, 1926, and during the night her dyspnea increased and a cyanosis appeared, most marked in the hands and feet. December 25, 1926, at 4:00 a. m., the patient died.

Permission for post-mortem examination was refused.

In this case the blood findings, as reported by Dr. P. F. Morse, are very interesting. The peculiarity consists in the variation of polymorphonuclear leukocytes, which it will be seen were found to vary from 64 per cent to 0. At three examinations they were found entirely absent and one examination showed 4 per cent.

II. ATYPICAL PRIMARY GRANULOCYTOPENIA

Four cases were classified in this group. Two were males and two females. The average age was 42.5 years. The type of onset of the illness varied considerably in the various cases. The duration of symptoms was rather brief and about the same as of the typical primary cases. The temperature in two cases was moderately high, the temperature in one case was not re-

TABLE III. ATYPICAL PRIMARY GRANULOCYTOPENIA

Case	32	33	34	35
Sex	M.	F.	F.	M.
Age	33	44	37	56
Type of Onset	Gradual	Sudden	Fairly Sudden	Gradual
Duration in Days — Total	15	?	9	19
Duration in Days — Acute	6	7	3	?
Temperature	102°	99*	103°	?
Leukocytes	9,100	1,150	8,900	7,900
Polymorphonuclears	0	20	—	1
Lymphocytes	100	80	—	99
Mononuclears	—	—	—	
Myelocytes	—	—	—	
Wassermann				
Hemoglobin	65	86	85	32
R.B.C. in Mill.	2.89	3.95	—	1.09
Blood Cultures	No Growth	No Growth	Not Done	Not Done
Location of Necrosis	No Necrosis	No Necrosis	Pharynx	Gums
T. Pneumonia	+	—	—	+
Death or Recovery	D.	R.	D.	D.
Autopsy	+	—	—	—

*Temperature never over 99.4°.

corded and in another the patient was afebrile throughout her illness. Three cases showed essentially normal total white cell counts, one showed a marked leukopenia. Three cases showed markedly diminished or absent polymorphonuclear cells. In one case a differential count was not made as the patient died shortly after entering the hospital. There was no anemia in two of the cases, one case showed moderate anemia and another severe anemia. Two had evidence of hemorrhagic diathesis (Nos. 32 and 35) in the form of low platelet counts and petechial hemorrhages in the skin. Two cases showed necrosis of the mucous membranes, two did not. Two cases had a terminal broncho-pneumonia. Only one of the four cases recovered; she is living and well more than a year after the illness and has had no recurrences. These cases were all examined rather carefully and due care was taken in arriving at a differential diagnosis. An autopsy was done on one of the cases and no pathology was discovered which was not compatible with the diagnosis of primary granulocytopenia. Autopsy studies should have been made on more of these cases, but the authors feel that they are all closely related to those cases included in Table I.

Evidence that these cases are related to typical cases of primary granulocytopenia might be adduced from the blood picture of some of the cases which have had repeated attacks. Note the blood picture of the third attack of case 3, the first attack of case 18, and the second attack of case 30 of this paper.

III. SECONDARY OR SYMPTOMATIC GRANULOCYTOPENIA

This is a heterogeneous group of 7 cases. Numbers 36 and 37 are cases of aplastic myeloid disorders occurring in luetic patients during the course of intensive arsphenamine treatment. Case 38 developed granulocytopenia following vigorous antiarthritic treatment with Farrastan. This case has been previously discussed. Case 39 is one of chronic aplastic anemia occurring in a 3.5 year old boy having a terminal Vincent's stomatitis, severe leukopenia and granulocytopenia. Cases 40, 41 and 42 had various forms of leukemia.

ASSOCIATION WITH SYPHILIS

Wassermann tests were taken on but 17 of the 42 cases of this paper. Four cases showed positive reactions (cases 1, 31, 36 and 37), all were middle-aged women, all died except case 36. The granulocytopenia of two cases (Nos. 36 and 37) developed during the course of intensive intravenous treatment with arsphenamine. The blood and clinical picture of these two cases was quite like that of classical agranulocytic angina.

Case 1 was a luetic with persistently positive Wassermann reaction. She had not received any form of anti-syphilitic treatment for 22 months previous to the development of the granulocytopenia. It seems unlikely that arsphenamine affected the bone marrow after 22 months. The authors are of the opinion that the relation here, between the syphilis and the occurrence of granulocytopenia, is one of mere coincidence.

In case 31 a positive Wassermann reaction was obtained at the time when the granulocytopenia occurred. This was the first and only Wassermann test made on the patient. Four years previous to the onset of the granulocytopenia she was in an automobile accident. At that time her skull was fractured and her scalp badly lacerated. The scalp wound healed slowly and a portion of the wound remained unhealed for several months. Ultra-violet ray treatments, caustics and curettage failed to effect healing. A family physician, whom she consulted, suggested that the failure to heal might be due to lues and suggested a Wassermann test. The patient refused to allow him to take blood for the test, but took the small doses of potassium iodide which he prescribed. The wound healed almost miraculously within about four days.

Her family history was negative for syphilis, she was never pregnant nor had she ever had any other form of antiluetic treatment than the small doses of potassium iodide for a few days. A Wassermann test taken on her husband was negative and he denied ever having had any form of antiluetic treatment.

The authors believe that the luetic infection in this case was merely incidental. It is unfortunate that permission for autopsy was refused.

GRANULOCYTOPENIA IN CHILDREN

No cases having the full clinical and blood picture of agranulocytic angina have been observed among the children of Detroit.

TABLE IV. SECONDARY AND SYMPTOMATIC GRANULOCYTOPENIA

Case	Sex	Age	Type of Onset	Duration in Days: Total	Duration in Days: Acute	Temperature	Leukocytes	Polymorphonuclears	Lymphocytes	Mononuclears	Myelocytes	Wassermann	Hemoglobin	R.B.C. in Mill.	Blood Cultures	Location of Necrosis	T. Pneumonia	Death or Recovery	Autopsy
36	F.	37	Gradual	App. 60	?	101.5°	1,700	13	84	3		+++	66	3.60	Not Done	Pharynx Tonsil Soft Palate Ante-cubital space	—	R.	—
37	F.	29	Sudden	7	7	102°	275	1	99			+++	72	3.76	No Growth	Pharynx Gums	+	D.	—
38	F.	43	Sudden	10	5	?	700	0	100				85	4.60	Not Done	Tongue Gums	—	R.	—
39	M.	3.5	Sudden	5	5	103°	1,900	0	100				65	2.45	Not Done	Pharynx Gums Tonsils Uvula	—	D.	—
40	F.	22	Gradual	40	26	103°	122,000*	3	11		86	—	30	1.81	No Growth	Oral mucous membranes Gums, Vagina, Labia majora Rectum	—	D.	—
41	F.	28	Gradual	14	5	104°	750	7	71	22		—	36	2.10	Not Done	Gums	—	D.	—
42	M.	26	Gradual	18	10	100°	2,950	10	61		20	—	76	3.76	Not Done	Tonsil Faucial pillar	—	R.	—

*Highest count.

Typical cases, occurring in children, have been reported in the literature.[19, 20] Case 39 of this paper presented a terminal picture very much resembling that of agranulocytic angina. However, this child had been under observation for several months and was known to have had a severe aplastic anemia during that period. The child was treated by repeated small blood transfusions and was discharged greatly improved. Two weeks later the patient was readmitted in extremis, with a blood and clinical picture quite similar to that of agranulocytic angina. The child died 36 hours after his second admission.

A number of other cases of severe aplastic anemia occurring in children will be found tabulated in Table IV. The records of these cases were obtained from the local Children's Hospital of Michigan through the courtesy of Dr. Thomas Cooley. Dr. Cooley has written about this type of case.[21]

RELATION TO LEUKEMIA

Three cases (Nos. 40, 41 and 42) showed leukemic blood pictures. One case (No. 41) had been seen and studied previously and was diagnosed aleukemic leukemia. Eight months later the patient again became ill with fever, dysphagia, sore throat and malaise. Physical examination revealed an acutely ill patient with moderate fever, injection of the pharynx, edema about the right tonsil, an ulceromembranous infection of the gums and a generalized pea to bean sized lymphadenopathy. The blood picture was typical of an aleukemic phase of lymphatic leukemia. There was a severe anemia with low platelet counts. A B.M.R. was +29 per cent. Mouth smears revealed numerous Vincent's organisms. The patient's condition grew worse and a week later her total white cell count abruptly fell from 6,000 to 850 cells per mm.^{3} She died the following day but permission for postmortem examination was refused.

Case 42 was a young adult male who developed what appeared to be a severe cold, sore throat of gradually increasing severity, and dysphagia. Examination revealed a moderately ill patient with slight fever, injection of the pharynx, edema of the peritonsillar region and a cervical pea to bean sized lymphadenopathy. No other lymph nodes were enlarged; the spleen was not palpable. There was a moderate anemia with approximately normal platelet counts. The polymorphonuclear cells were markedly diminished and myelocytes were present in from 12 to 39 per cent. The peritonsillar swelling was replaced by ulceration and sloughing which healed in a few days. The patient made a fairly rapid symptomatic recovery but his blood picture remained about the same as on admission. He was discharged much improved and was advised to return each week for check-up, but has failed to keep his appointments.

Case 40 was a young woman; following the extraction of a left upper molar, the adjacent gums became painful, bled freely and healed slowly. The left jaw became swollen and painful with resulting dysarthria and dysphagia. She became feverish, lost her appetitie and felt weak. Examination showed marked swelling of the left upper jaw, limitation of motion in the tempero-mandibular articulation and unhealed gum margins. There was no local or general lymphadenopathy. Her temperature was moderately elevated. Roentgenograms showed the presence of an infective osteitis in the left superior maxilla.

Eleven blood counts were taken. The R.B.C. rose from 2.01 million to 2.84 million (transfusion) and gradually fell to 1.81 million. Hemoglobin percentage rose from 45 to 55 and gradually fell to 30. Total white cell counts rose almost steadily from 27,600 to 122,000 per mm.^{3} Mature polymorphonuclear leukocytes were present in from 3 to 11 per cent, myelocytes were present in from 34 to 86 per cent. No platelet counts were made.

Shortly after admission to the hospital the patient developed an ulcerative gingivitis and stomatitis which slowly extended over much of the oral and pharyngeal mucosa. A superficial non-indurated ulceration appeared on the left labia majora; this spread, involving the labiæ and vagina extensively. Terminally, a few small, superficial ulcers appeared in the rectal mucosa. There were no petechial hemorrhages in the skin or mucous surfaces but the patient expectorated bright red mucus on several occasions and once had an emesis of food and bright red blood. She died, but permission for autopsy was refused.

These and other published cases[22] demonstrate a relation between agranulocytic angina and leukemia. In each of these cases the picture of agranulocytic angina was

superimposed upon or followed a picture of leukemia.

In each of these cases there was some evidence of concomitant infection. Leukemic individuals are notoriously susceptible to infections and show atypical defense reactions to them.

Howell[23] noted that leukemic individuals, when given typhoid vaccine in dosages which cause agglutinin formation and opsonin production in normal controls, fail to produce these antibodies. Leukemic individuals who contract typhoid or paratyphoid infection may fail to develop the specific agglutinins in the blood.

Rotky's experiments[24] with a harmless bacterial species showed a failure of leukemic individuals to develop specific anibodies while normal controls would produce the antibodies.

Howell[23] also noted that the leukocytic reaction of leukemic individuals to vaccination is quite variable. Some of the cases reacted, as do normal individuals, with a leukocytosis. Some showed no change in the white cell count and in others there was a definite leukopenia. Howell believes that the variable leukocytic reaction, like the failure of antibody formation, is probably the result of leukemic alterations in the hematopoietic tissues.

Jordan and Falk[25] cite experimental evidence that the normal site of antibody formation is likely in the hematopoietic tissues, probably in the reticulo-endothelial cells.

Leukemic individuals do not react to malarial infection as do normal persons.[26, 27] Instead of an increase in the enormous number of circulating leukocytes, a marked decrease occurs. The total white cell count may fall to an approximately normal figure and symptomatic improvement of the leukemia is frequently observed. Attempts have been made to use malarial inoculation as a therapeutic measure in leukemia, but these efforts have been abandoned because of the danger to the life of the patient and the transitory character of the remission.

SUMMARY

Previous attempts at classification of cases of granulocytopenia are critically discussed and an original classification is proposed. Forty-two cases of granulocytopenia from a single locality (Detroit, Michigan) are presented and classified. The relation of pri-

TABLE V. SECONDARY GRANULOCYTOPENIA IN CHILDREN

Case	Sex	Age in years	Diagnosis	Pathological Examination	Leukocytes	Polymorphonuclears	Large Lymphocytes	Small Lymphocytes	Basophils	R.B.C. in Millions	Hemoglobin	Platelets	Necrosis	Result
1.	M.	3	Aplastic anemia Lymphoblastoma	Biopsy	200	4	32	64	0	2.88	50	10,000	None	Death
2.	M.	4	Aplastic anemia Osteomyelitis of jaw	Autopsy	3,000	1	3	96	0	1.00	30	*	Buccal mucous membrane over the osteomyelitis	Death
3.	M.	1.5	Aplastic anemia Chronic bilateral otitis media and mastoiditis	Autopsy	300	4	0	96	0	1.78	35	10,000	None	Death
4.	M.	8	Aplastic anemia Hodgkin's disease	Autopsy	16,000† 3,600† 5,400†	17 46 39	62 28 20	17 24 36	4 0 3	1.80	35	*	None	Death
5.	F.	5	Aplastic anemia Cause unknown	None	900	40	44	16	0	2.20	35	*	None	Death
6.	F.	4.5	Aplastic anemia Cause unknown	None	1,100	0	0	100	0	1.84	25	100,000	None	Death

*Too few to count.

†Counts taken on the last 3 days of life.

mary granulocytopenia (agranulocytic angina) to other conditions is discussed.

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NEWER PHASES OF CHILDHOOD TUBERCULOSIS

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Perhaps in no other disease can the physician exercise his ingenuity as a public health agent and practice preventive medicine as in childhood tuberculosis. More than in any other specialty, the pediatrist is looked upon, not only to alleviate the suffering of children and cure disease, but to prevent disease and to make the community in which the child lives a better one. Among the diseases in which considerable progress has been made during the past ten years, tuberculosis ranks with the first. Our views on tuberculosis, especially the childhood type, have been changed considerably since this extensive work has been done in this country.

Tuberculosis, like many other diseases, had many classifications of the various stages of the disease. To simplify matters, the National Tuberculosis Association divided tuberculosis into two main divisions, the childhood and the adult type of the disease. The characteristics of the childhood type of tuberculosis are:

1. Usually occurs in childhood, occasionally in adults.
2. Is the result of a primary infection.
3. May be localized in any part of the lung.
4. Tracheobronchial lymph nodes are always involved.
5. Excavation is very rare.
6. There is little tendency to fibrosis.

The characteristics of the adult type of tuberculosis are:

1. Usually occurs in adults, rarely in children.
2. Is the result of a reinfection, exogenous, or endogenous in origin.
3. Lesion is usually localized in the upper part of the lung.
4. Tracheobronchial nodes are not involved by this infection.
5. Caseous lesions are followed by excavation and fibrosis.

In general, we consider tuberculosis an acquired disease; however, there are slightly less than two hundred authentic cases of congenital tuberculosis. Ordinarily the human placenta acts as a barrier to disease germs which are floating around in the blood stream of the mother. Still, we can conceive of a tuberculous mother damaging the placental filter just enough to allow passage of the germ to the fetus without causing active disease of the placenta itself. This remains a matter of speculation, which has to be proven by more scientific study.

We are of the opinion that individuals become infected with the tubercle germ during childhood. The percentage of infection increases with age of the child and varies according to hygienic surroundings. Tuber-

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culosis infection is not universal and is not as prevalent as we were led to believe at one time. From observation made in European clinics, it was thought that most children at the age of 18 years were already infected with the germ. However, observations made in this country did not bear this out. Chadwick and Zachs reported 42,000 cases in 1929 with an average percentage of infection of 28 per cent; Matill and Fenger reported 1,400 cases with an average infection of 15 per cent; Rathburn reported 4,200 cases with an average infection of 35 per cent. These cases ranged from one to 18 years of age. Observers working with adults report an average of 60 per cent of infection.

In general, we divide tubercular infections into two main types, the human and bovine. For all practical purposes, the bovine type can be ignored after infancy, as it has been conclusively shown that over 90 per cent of infections in children are due to the human type of organism, since the pasteurization of milk and the scrupulous examination of cattle. Further, those children infected with the bovine germ also give a positive tuberculin reaction when tested with the human organism. Whether or not a child shows signs of infection will depend entirely on his exposure, either directly or indirectly, to an open case of tuberculosis. This is usually of the adult type; however, certain types of tuberculous children are also infectious. Most observers believe that all children repeatedly exposed to an open case of tuberculosis will become infected.

The tubercle germ enters the body of the child, usually, either through the respiratory or the digestive tract. The most common route appears to be the respiratory; however, the younger the child the more chance of contaminated food and other articles entering the mouth. It is true many more bacilli are swallowed than inhaled, but according to European observers the lung has a predilection for infection, because of its abundant blood supply and its inadequate lymph supply. The less common portals of entry are, (1) the abraded skin, as in circumcision, (2) the conjunctival sac, and (3) the nose, throat and middle ear.

Tuberculous infection and tuberculous disease are not synonymous. Repeated exposure to the tubercle germ invariably results in infection. Whether or not a child will take down with the disease depends on the dosage of the infection and the resistance of the child. Not so long ago we believed infants infected with the tubercle bacillus were doomed to die. Today, we know that simple tuberculous infection in infancy does not lead to clinical disease in a high percentage of cases. Only through repeated infections do we find clinical evidence of disease process. Further, we have on record many cases of tuberculous disease in infancy with apparent complete clinical recovery.

We have a definite method of detecting tubercular infected children, that is through the tuberculin test. There are several methods in applying the test in use. They are: (1) the Cutaneous or Pirquet test, (2) the percutaneous, or Moro test, (3) the intracutaneous or the Mantoux test, (4) the conjunctival, or Calmette test, and, (5) the multiple puncture, or the Craig test. The two most commonly employed are the Pirquet and the Mantoux test. Where large surveys are being done in school children, the Pirquet method is usually used. This test is usually applied on the forearm. The forearm is cleaned with alcohol, three scarifications are made with the Pirquet borer and the tuberculin is then applied on the two outer scarifications, the middle one serving as a control. This test is then read from 48 to 72 hours after application. This method will probably miss from 6 to 10 per cent of tuberculin-positive children. The Mantoux test is the more positive of the two and consists of introducing tuberculin in various dilutions in a similar fashion to the Schick test. We usually begin with 0.01 mg. and increase to one mg. to obtain a positive test. Recently Forbes and Steinberg reported a higher incidence of positive reaction from the Craig test than the Pirquet, but slightly less than the Mantoux test. This test is performed like an ordinary vaccination, the tuberculin being applied to the skin and then 15 to 20 puncture wounds are made, after which the tuberculin may be wiped off.

Having screened out the infected children, with the tuberculin test, we then proceed to find those that have tuberculosis, the disease. As we have previously said, out of a large group of infected children only a small group will be actually diseased. Chadwick after examining 51,000 school children in Massachusetts, found 28 per cent of them

infected: 1.5 per cent showing the actual childhood type of tuberculosis; 3.4 per cent showing suspicious lesions. Our method of diagnosing childhood tuberculosis depends upon several measures. First, we must get a careful history of the child, especially in relation to exposure to the disease; second, a careful physical examination of the child must be made, and third, an X-ray study of the chest of all reactors must be done.

In regard to the history of the patient, it is not always possible to obtain a history of direct exposure to the disease. On carefully questioning all contacts of a child, it will be surprising the number of open cases of adult tuberculosis frequently found. Besides a history of exposure, a complete medical history of the child relative to symptoms of tuberculosis is essential. As the disease has an insidious onset and the course is rather protracted, the symptoms in the child are very vague and often absent. We may obtain a history of fatigue and lassitude with a poor appetite and weight loss or failure to gain in weight. The younger the child the more apt is he to have a positive history. However, Opie working at the Phipps Institute found evidence of childhood tuberculosis as frequently in the well nourished child as in the under-nourished. Frequently we get a history of an irregular or prolonged slight elevation of body temperature, associated with frequent upper respiratory infections and chronic persistent cough. In general, however, our history is not an accurate method of diagnosing childhood tuberculosis, unless we have a positive history of exposure in a tuberculin-positive child and X-ray evidence of disease.

Our least definite method of diagnosing childhood tuberculosis is through physical examination. Only when we have definite parenchymal infiltrations of considerable extent do we find physical alterations in the lung relative to palpation, percussion, or auscultation. Interscapular or paravertebral dullness, D'Espine's and Eustache Smith's sign have all been found to be unreliable in cases of childhood tuberculosis as shown by X-ray examination of the lungs. Pleurisy, while a frequent finding in the childhood infection, is often undiagnosed because of the small amount of fluid usually present. When primary infection enters the tonsils, the cervical glands of the neck, or the mesenteric glands of the abdomen, the findings are less indefinite, but the diagnosis will depend upon other evidence of the disease, such as a history of exposure and a positive tuberculin test.

Our most reliable method of diagnosing childhood tuberculosis is through the roentgen examination of the lungs. This is true because sooner or later in the course of the disease the primary infection or its secondary effects will show itself in the lung tissue or the regional lymph nodes. To understand this we must recall for a moment the pathologic sequence of events in the progress of a tubercular infection in the lung. Most observers believe the tubercle bacillus is aspirated into the lung similar to a foreign body. The tubercle germ sets up, almost immediately, a primary alveolitis with a specific tissue reaction, a pouring out of lymphocytes with a secondary formation of epithelioid cells and giant cells. Almost at once there is a metastasis in the regional lymphatics, draining the diseased pulmonary area. There is usually a marked peripheral inflammatory process around the primary focus, especially in infancy and early childhood. This primary focus may either completely absorb without leaving any permanent scars or it may undergo the changes characteristic of tuberculous lesions, caseation, fibrosis and calcification. In childhood there is very little tendency to excavation and cavity formation, although this may occur. There is also little tendency to fibrosis. The primary lesion usually undergoes central caseation and later takes on calcium or true bone deposits. This process may go on for years until the primary focus has become calcified enough to show upon X-ray examination. This primary calcified focus is frequently, although not always, found on X-ray examination of the lungs.

More frequently found than the calcified primary focus, or the Ghon tubercle, are changes in the tracheobronchial lymph nodes; as we have said previously, almost immediately upon the setting up of a primary infection in the lung tissue, a similar process is noted in the regional lymph nodes. These nodes at first become enlarged due to a direct inflammatory process of the gland and a secondary peripheral inflammation surrounding the gland. These glands undergo in a similar fashion caseation, and calcification. In the young infant the glandular enlargement may very rarely cause marked

dyspnea. Almost invariably a previous childhood tuberculosis will reveal itself in the tracheobronchial nodes. Krause has shown when a tuberculous process exists in parts of the body remote from the lung, the tubercle bacilli are carried to the hilum of the lung and produce enlargement of the nodes. The primary lesion in the lung may have completely healed by resolution and disappeared, or it may be in some obscure portion of the lung, which accounts for its frequent absence on X-ray examination. However, according to McPhedran, evidence of the primary infection is almost always found in the tracheobronchial nodes, either as enlargement or calcification. The Ghon tubercle with the calcified hilum glands is frequently referred to as the primary complex of Rancke. From the primary infection in the lung or hilum glands the disease may spread by continuity to the neighboring lung tissue or through the blood or lymph stream to various organs of the body. In the young infant, we sometimes find widespread metastases with a miliary involvement of the lung or other organs of the body, even brain tissue. However, this occurs less commonly than we were once inclined to believe. The older the child, the less frequently does this happen. In the child of school age or adolescence, there is evidence of some immunity to the tuberculous infection, as there develops a localized process in the lung without a lymphogenous involvement of the tributary lymph nodes. This lesion is usually apical and is the early adult type, which, however, may very readily progress into the fatal adult disease with excavation and fibrosis of the lung tissue. Opie, through numerous autopsy examinations, has demonstrated previous childhood lesions in over 90 per cent of fatal cases of adult tuberculosis.

Childhood tuberculosis is for the most part a curable disease. The earlier the diagnosis, the prompter the correct mode of treatment is instituted, and the more certain is the cure. Childhood is the real incipient stage of tuberculosis; it is the golden opportunity when a speedy and permanent cure can be obtained.

Through prompt and early detection of the disease in childhood, most observers believe a large share of the fatal adult cases of tuberculosis can be prevented. Thus we see that childhood is the most important period in the history of tuberculosis; it is the age period in which curable cases of tuberculosis are frequently found.

Our method of treating childhood tuberculosis is in general quite simple. If there is a definite inflammatory process in the lung with enlargement of the regional lymph nodes, sanatorium treatment with absolute bed-rest is indicated. Most cases of childhood infection can be treated at home, provided the following regime is carried out. First, we must try to remove the child from further contact with the disease; in other words, we must discover where the child obtained his disease. Frequently, we will be surprised to find some member of the family or relative, or friend, who requires active treatment for the disease. This is perhaps the most important of all our methods of attack against the childhood infection. Second, we must regulate the life of the child with reference to sleep, exercise and diet. Proper, hygienic surroundings, sufficient fresh air, and a well balanced diet with the proper vitamins are essential in the treatment. Further, all physical defects should be removed and the general condition of the child's body health should be maintained. The establishment of open air and open window schools with proper nutritional classes has a marked effect in the treatment of cases of childhood tuberculosis.

While we believe childhood tuberculosis is for the most part a curable disease, we must not be over-optimistic. Calcification does not always mean the disease is inactive, or in a latent stage. It is possible for areas of caseation to be adjacent to calcium deposits, which may act as a potential source of danger. Rathburn has shown that in 50 per cent of cases of adult and fatal type of tuberculosis developing in high school boys and girls old calcified childhood lesions could be demonstrated. Rathburn, as well as Myers, believes that the 3 or 4 per cent of children who have the childhood type of tuberculosis will furnish 75 per cent of the teen age boys and girls who develop the adult and fatal type of disease. For these reasons, Chadwick and others believe children showing the childhood infection should be scrupulously observed through the twentieth year of life, including repeated X-ray follow-up examinations of the lungs. Our only means of preventing tuberculosis in infants and young children is the avoidance of exposure of the child to adult cases of tuberculosis. Further, it is believed that

most cases of positive tuberculin children and those already showing evidence of childhood infection will handle their infection very well if further contact with the germ is avoided until complete healing has occurred. After infancy, the child withstands the average infection with the tubercle germ very nicely, so that the avoidance of exposure to the germ during the first two years of life is essential if the mortality rate of tuberculosis is to be decreased. Heimbeck, working among student nurses, concluded that a positive tuberculin test in a healthy adult person was an expression of immunity, and even went so far as to actively immunize adults with the B. C. G. vaccine. Calmette and his co-workers, in 1921, developed an attenuated strain of the bovine tubercle bacilli and recommended its use in immunizing newborn infants who might be later exposed to the disease. This became known as the B. C. G. vaccine and was fed to infants on the third, fifth and seventh days of life. If a positive tuberculin test did not result in six to eight weeks, a small dose was given subcutaneously. To date more than 400,000 infants have been vaccinated in France, without any ill effects. However, this method has not become one of general use, because of the belief that this avirulent strain of organism after years of habitus in the human body may again become virulent. Petroff and his co-workers in this country have shown this to be true in animals. In a similar fashion, one is never assured that a simple childhood infection may not progress into a more fatal type of lesion. Therefore, it is necessary to protect older children and adults, as well as infants, from exposure to the tubercle germ until we learn more about the development of immunity to this disesae.

Through extensive educational programs being carried out by the National Tuberculosis Association, the death rate from all forms of tuberculosis has been reduced considerably during recent years. In Detroit the death rate from all forms of the disease in 1920 was 131 per 100,000 population, while in 1929 it was 93 per 100,000, a decrease of 29 per cent, and in 1930 it was 82 per 100,000. However, tuberculosis is still considered America's great white plague. It claims the lives of 100,000 citizens annually. It ranks third in the causes of all deaths, being surpassed only by heart disease and pneumonia. Last year tuberculosis caused 6.2 per cent of all deaths of white persons and 21.6 per cent of negroes in Detroit. Between the ages of twenty and forty-five years, it causes more deaths than heart disease, pneumonia, cancer, kidney disease or diseases of the arterial system. About two million people have some form of tuberculosis and about one million persons have active disease of the lung. Our educational program should be carried out even more extensively in the high school group, as it is just beyond this age-group that the disease is exacting its heaviest toll, especially in the adolescent girl. Only through the routine examination of children with the tuberculin test and the X-raying of all positive reactors for evidence of the childhood infection can we hope to discover the disease in its earliest seeding and prevent the fatal form of tuberculosis in the adult.

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THE INCIDENCE OF HEART DISEASE IN RHEUMATIC FEVER*

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Acute rheumatic fever has, of late years, received considerable attention at the hands of cardiologists, as it is preëminently a condition which is associated with cardiac pathology. One of the chief contributions to information along this line is a monograph on Rheumatic Heart Disease by Carey Coombs, from which the historical bacteriological and pathological data have been taken.

Electrocardiographic studies have been made by a number of men, as, for instance, Levy and Kenneth B. Turner in The Archives of Internal Medicine for February, 1929, in which they state that in 76 of 78 cases there was a change in auriculoventricular conduction, resulting in an abnormally long P-R interval.

In order to compare the effect of this disease in our area with these other writers, we have taken serially 100 staff cases‡ of acute rheumatic fever in our service at St. Mary's Hospital, which we were enabled to follow up because of the fact of our also being in charge of the out-patient department, to which all these patients were referred after leaving the hospital. In this work, we are ably assisted by an efficient social worker.

The relation between rheumatic fever and cardiac pathology was first noted by Edward Jenner, in 1789, it being stated that at a meeting he "favored the Society with remarks on 'Disease of the heart, followed by acute rheumatism,' illustrated by dissections." About the same time, at St. Bartholomew's Hospital in London, mention of this relation was not merely occasional but frequent. It was he who first insisted on the frequency with which the valves of the heart are affected in rheumatism and he showed that the valvular lesions were not transitory but permanent. From this time on, evidence was continually being brought forward by various physicians along this line, and within the last few years Aschoff has shown that there is always an inflammation of the cardiac muscle which is not limited to the immediate neighborhood of the serous membranes but is scattered about in spots throughout the entire cardiac wall. Whether the heart condition should be considered as the complication, or, as seemed reasonable to some, that it preceded the polyarthritis and chorea and other manifestations, may be a matter of argument. I personally have seen one case in which the heart condition was plainly prior to the arthritic manifestations. Until the time comes, however, when more frequent physical examination will make it possible to determine this point, it must be assumed that the joint condition usually appears before any definite heart lesion is demonstrable. It is quite evident from this particular series of cases which we have studied that the lesions of the heart are not the rule during the first attack. This fact may, however, be more apparent than real, as the joint condition resulting in swelling and pain is readily observed, while the heart condition may be present, of a mild type, so as to very little alter the heart rate or rhythm, change the size of the heart or cause any disturbance in the heart sounds. The seed may be sown at the same time or possibly earlier in the heart than in the joints but the time when the signs are evident is considerably longer in the heart than in the joint condition. Many cases leave the hospital apparently recovered of joint manifestations, even without any recurrence, but years later show up with a mitral stenosis or other disabling heart condition. It has been our conclusion from clinical observation that the etiological factor was some strain of streptococcus. Poynton and Paine, in 1900, succeeded in recovering a small diplococcus from the heart's blood and other tissues and fluids, of eight cases of acute rheumatic infection. Without going into detailed description of this bacterium which they called diplococcus rheumaticus, it has continued to be their opinion that this is the causative factor. Bacteriologists have not been unanimous in

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‡Electrocardiographic changes in the way of lengthened P-R intervals were not noted in this series.

this opinion as others have been isolated as the strain in this condition and considered as the etiological factor. Whatever bacterium it is, the evidence all points to some *one* and the old idea that diet has any influence in its production has been entirely abandoned. As with other infections, there is varying human resistance; some people may be exposed to this infection continuously and never develop rheumatic manifestations. Swift and his co-workers have explained this on the theory of an allergic condition in these patients. Whether this be true or not, there is no question that lowered resistance in the form of undernutrition and undue exposure to cold and dampness are favoring factors. While not escaped entirely by the wealthier members of the community, it is preëminently a disease of people who live under poor hygienic conditions generally, improperly housed and undernourished.

Carey Coombs, from experience of over twenty years in Bristol, England, where he was enabled to follow some patients for this period of time, there being practically no floating population, gives as the pathological condition the following:

"The characteristic interstitial lesion of rheumatic myocarditis is the 'submiliary nodule,' a type of inflammatory focus which is not met with in other forms of cardiac infection, though it does also occur in other organs and tissues attacked by rheumatism (endocardium, pericardium, subcutaneous tissues, synovial membrane, kidney and piamater). In the myocardium, however, it is most readily distinguished, because the inflammatory background which surrounds the nodule when it appears in the other tissues and tends to conceal it, is absent or subdued in the cardiac wall, so that the peculiar features of this lesion are thrown into bolder relief. The components of the nodule are: (1) A fibrinous matrix, which probably consists not only of fibrin but also of cellular debris. (2) Certain large cells, varying in shape but often elongated and fusiform when occurring in the myocardium, having a plentiful supply of deep-staining amphophile cytoplasm, finely granular as a rule and from one to seven or more nuclei, usually of the wheel type in plasma cells; these large cells develop from vascular endothelium and some of them probably represent sprouts of new capillaries. (3) Fibroblasts and plasma cells, the latter being in many respects closely akin to the smaller uninucleate varieties of the (2) type of cell. (4) Leukocytes, chiefly lymphocytes.

"In the earliest phase of the nodule, there are so many lymphocytes and plasma cells that they obscure the fundamentally proliferative nature of the reactions. They, however, gradually disappear, leaving the big cells arranged in and around the fibrinous matrix, set in a framework of fibroblasts. A majority of these nodules lie in contact with the arterioles and may develop in their adventitia or even in their media. The earlier nodules are less definitely delimited and radiate from their point of maximum density along the finer planes of connective tissue between the myocardial cells; but when the lesion is mature its outlines are definite. The muscle cells are thrust aside and crushed a little by the spreading of the nodule. As it disappears it is replaced by a modicum of fibrous tissue. These interesting inflammatory spots are found most abundantly, as a rule, in the walls of the left ventricle and in the septum ventriculorum near its base; they are seen also in the right ventricle, but in the auricular walls they are hard to find, and when they do occur they are often in close relation with the auriculoventricular rings. Indeed, it seems they are particularly fond of the tracts of muscle which border on the central fibrous body, where the latter sends out gradually attenuated strands of connective tissue between the muscle fibers. They may be deeply embedded in the myocardium or in near relation to its serous investments. When in close proximity to the mural endocardium, they are sometimes associated with inflammatory changes in the latter tissue. They have been found in close relation to the a-v bundle, but my own observations have not pointed to any special predilection for this site.

"The blood vessels suffer much and in almost every degree. The mildest change is turgescence of the endothelial cells of capillaries and arterioles; in the next phase, these are seen to proliferate, so much so that the lumen of a moderate arteriole may quite disappear. This being so it is not surprising that thrombosis is a fairly common event. Most often it is in capillaries and small arterioles and venules that this is seen; but sometimes larger arteries may similarly suffer and it has happened to even a main coronary trunk. Perivascular changes, too,

are the rule. Circles of fibroblasts are formed around capillaries and arterioles and the nodule which has already been described is sometimes wrapped like a sleeve around the vessel for an appreciable stretch of its course. In a few instances they have been seen arising in the arterial media.

"The changes in the myocardial cells present are as follows: In the very acute cases, cloudy swelling is seen, sometimes in patches but more often diffusely spread throughout the myocardium. In my experience it is never very intense. Fatty metamorphosis is the most definite phenomenon seen but it is not found in every case and it is also a feature of the later stages of the disease when active inflammation has long been quiet, so that it cannot be regarded as a satisfactory index of the extent to which the several parts of the myocardium are feeling the direct influence of the bacterial poison. It is most definite, as a rule, in the wall of the left ventricle, in particular in those parts of the muscle which lie nearest to the pericardium; sometimes it seems to be more concentrated in the immediate vicinity of the nodules but this is not a safe general rule.

"Careful examination of hearts, in most of which the sino-auricular node and the auriculo-ventricular bundle were examined in series, reaching throughout their length, has proved to me that there is no special incidence of inflammatory or degenerative changes in either. In one case, one of the bays of blood diving in between the pectinate muscles of the right auricle had actually burst through the endocardium and invaded the sino-auricular node at the middle of its length; in one other, submiliary nodules of small size were seen on the edge of the s-a node; and in cases of chronic cardiac rheumatism with advanced intracellular degeneration, the fibres of the s-a node and the a-v bundle may show in a mild degree those changes that have reached a high pitch in the ordinary fibers of the auricular wall. The intravascular reaction of chronic cardiac rheumatism is often displayed in an extreme degree in the artery to the a-v bundle. I have seen it almost completely occluded; yet the fibres of that same bundle were scarcely altered from the normal.

"Endocardium: The valves are injured by rheumatic endocarditis in the following proportions, as ascertained by an abstract of autopsy findings from Bristol General Hospital. From this I have excluded ulcerative endocarditis but have included all phases of undeniably rheumatic lesion of the valves:

Comparative Incidence of Valve Injury in Rheumatic Endocarditis
97 Autopsy Records

No. of Cases	Mitral	Aortic	Tricuspid	Pulmonary
97	97	57	35	2

"The mitral valve was injured in every case, the mitral and the aortic in 34, the mitral and the tricuspid in 12, the mitral, aortic and tricuspid in 21 and all four valves in 2. It may, therefore, be said that in all cases of rheumatic carditis the mitral valve is injured, the aortic in half, the tricuspid in a third and the pulmonary valves scarcely ever.

"Microscopical examination of a valve acutely inflamed as a response to rheumatic invasion shows certain phenomena which it is difficult to arrange in chronological order. This much may be said: The deeper structures react before there is evidence of injury to the endothelial surface. These deeper reactions are mainly formative, partly exudative. Proliferation occurs in the fixed connective tissues, resulting in a free formation of fibroblastic cells; and blood vessels are rapidly produced, being presumably projected into the valve from these vessels which normally penetrate but a short distance into its basal part. The quickness with which a valve becomes permeated with new vessels is remarkable. Around the newly formed vessels, fibroblasts are arranged in concentric circles. Their endothelium, attacked by toxin, swells up, proliferates and is shed. Thrombosis follows and in the course of time a submiliary nodule may be produced.

"On the surface, the first departure from normal is endothelial proliferation, which often occurs over a wide area. Very soon this is followed by degenerative changes in the endothelial cells, those lying most superficially failing first and most. These undergo coagulation necrosis and become covered with fibrin, which is heaped up to form granulations at a point not far from the free edge of the valve, though not elsewhere as a rule. To this fibrin is added a layer of polymorphonuclear leukocytes, deposited by the passing intracardiac blood.

"Of the permanent results of rheumatic endocarditis the mitral lesions are the most frequent and characteristic. It is as correct to regard mitral stenosis as being always

rheumatic as it is to speak of tabes dorsalis as being without exception due to syphilis. The description of post-rheumatic fibrosis of the mitral valve is, therefore, that of mitral stenosis and vice versa. The cusps are thickened throughout, though most definitely so at, or near, the free edge. Accompanying the thickening there is a shortening so that the segments are drawn up towards the auricles, a position in which they are immovably fixed by the stiffening effect of the fibrosis. This fixation is further increased by the cicatricial changes in the chordæ tendinæ, which, arising at the same time and in the same way as in the valve segments, have progressed at the same rate as in the latter. At the same time the endocardial folds which pass over from the extremity of each cusp to the corresponding extremity of the other cusp have also shortened and thickened, so that the mitral channel is encroached upon in every direction.

"A word remains to be said as to the influence of one valvular lesion upon others. The only notable fact is that mitral stenosis. in the accurate sense of the word, is to some extent prevented by the coincidence of aortic regurgitation or pericardial adhesion. Mitral fibrosis is sure to be present in either case, if the aortic or pericardial lesion be of rheumatic origin, and it may be of extreme degree; but the effect of persistent ventricular over-distention is to hold the mitral ring open and to prevent narrowing, even in the presence of advanced valvular cicatrization.

"In the first decade 87.5 per cent of all rheumatic valvular lesions show active changes; in the second decade 75.8 per cent; in the third 43.4 per cent; in the fourth, 33.3 per cent; after the age of forty, 23.8 per cent; and taking all ages together 51.6 per cent.

"The incidence of rheumatic infection of the heart on the pericardium is illustrated by the following facts from the Bristol General Hospital post-mortem records:

"In patients dying in the first decade 100 per cent showed pericardial lesions; in the second, 83 per cent; in the third, 41.6 per cent; in the fourth 23 per cent; after the age of forty, 26 per cent; and taking all ages together 53 per cent."

The following tabulation of our cases has been made: as to sex, race, age-groups in decades; the next table shows the information received concerning the effects of first, second and third or more attacks, on the heart.

Total number of cases	100			
Male	64	White	Colored	Chinese
Female	36	93	6	1

Age Groups

	1-10	10-20	20-30	30-40	40-50	50-60	60-70
Male	4	16	17	16	5	4	3
Female	1	6	17	9	1	1	1

Effects on the Heart—First, Second or Third Attacks

First attacks	80	No apparent heart disturbance	56
		Heart disturbance	24
		Pericarditis	1
		A2 accentuated	2
		Mitral insufficiency and stenosis	2
		Mitral stenosis	4
		Mitral insufficiency	14
		Heart block	1
Second attacks	14	No apparent heart disturbance	3
		Heart disturbance	11
		Mitral insufficiency	1
		Aortic and mitral insufficiency	1
		Pulmonary systolic murmur	1
		Mitral insufficiency and mitral stenosis	4
		Auricular fibrillation	2
Third attacks	6	No apparent heart disturbance	2
		Heart disturbance	4
		Mitral insufficiency	1
		Auricular fibrillation	1
		Mitral insufficiency and mitral stenosis	2

Symptomatology: The usual onset in the cases observed is pain in the joints, commonly involving first the joints of the lower extremities, the ankles, then the knees, and rarely the hip joints. While the pain may be associated with only stiffness, in this particular series we have chosen only those cases which showed, as well, swelling (usually some redness) and increase in local temperature. A characteristic feature of the

joint infection is the tendency to move from one joint to another. Whenever this condition becomes localized for any considerable period of time, other conditions should be suspected, particularly gonorrheal arthritis and, occasionally, osteomyelitis, and, rarely, abscess formation around the joint. These various conditions are usually easily cleared up by X-ray examination and study of the history; and in general all joints persistently diseased should be subjected to X-ray examination. The blood-count is also an important feature of examination and observation. In some types of infection, there may be marked leukocytosis. The highest in our table is 23,700, this being accompanied by a high poly count. In one fatal case, we had a moderate leukocytosis, 11,120, but a poly count of 93%. An important practical point in this connection is that no patient should be discharged without having a blood-count run, which, if normal, should be subject to a recheck, at least within a period of thirty days. No patient should be discharged from a doctor's care for at least three months after the initial period of fever and joint manifestation. This was well illustrated in the case of L. D., who, after an initial febrile period lasting only three days and after a normal temperature for five days more, was discharged from the hospital, apparently free from symptoms, yet the blood count was still 12,400, but polys only 48 per cent. Within a short time, marked cardiac pathology was present. The usual onset is not associated with symptoms in other parts of the body. Occasionally, however, as in case of M.S., there was a certain amount of pulmonary involvement, evidently as attack of bronchitis. One of the cases, B. O., presented, as a first symptom, severe abdominal pain of short duration, which was repeated later in the day, at which time the left knee joint was also painful. Pain in the chest was also complained of early, being particularly manifest on deep inspiration. On the evening of the second day, he experienced considerable difficulty in getting breath while in a reclining position, this becoming more marked the next day. The night before entering the hospital, there was marked dyspnea. When first seen by me, he presented a well defined to-and-fro pericardial friction rub, the diagnosis being fibrinous pericarditis. Ten days later, the friction rub still persisted. Two days later, only a systolic rub was noted, and five days later, the heart sounds had become clear.

Cases of frank nephritis were not seen in this series, but signs of renal irritation were fairly common, forty of the cases showing albumin, in thirty cases only a trace, four X, four XX and two XXX.

The Wassermann tests run numbered 88, with 14 positive, which would probably be about the average for the type of patients we had under observation. Blood cultures were run in a number of cases, but we never secured any positive.

Our electrocardiographic results are as follows:

Patients cardiographed	20
Normal rhythm	16
First attack	12
Second attack	2
Third attack	2
Left axis deviation	
First attack	1
Low voltage in I and III	
Heart block—Partial	
First attack	1
Intraventricular	
First attack	1
Auricular fibrillation	
Second attack	1
Fifth attack	1

Treatment: This consisted of rest in bed and light diet, the drug therapy being sodium sal. 20 grains and sodium bicarbonate 40 grains every two hours. This treatment usually was continued through the first three days, with the temperature falling at the end of this time. Occasionally, the period of temperature elevation lasted a week. When the temperature did not drop within this period, it was customary for us to administer daily an ampoule containing 15 grains of sodium sal, which was given intravenously. We have also found the administration of sodium cacodylate to be followed by marked benefit, especially in the attacks in children, though we have also been successful with its use in adults. It has been given orally to children in doses of one grain three times a day and in proportionately larger doses for adults. This produced a distinctly garlicky odor to the breath, but we have never seen any case with definite arsenical toxic effect.

Tonsillectomies: Few of the cases studied had been tonsillectomized, only six prior to the acute attack, one after the first attack, and it was considered advisable to do a tonsillectomy on one case during the attack. This is rarely necessary and should only be

undertaken after mature consideration. One case under recent observation was definitely benefited by such a procedure, but we have at present under our care a patient with acute rheumatic fever, who had had previous attacks and whose present attack followed immediately upon tonsillectomy. However, we make it a rule to see that all cases are tonsillectomized at a reasonable period after the acute attack, the ordinary interval allowed being four weeks, in special cases a longer time being allowed to elapse.

Summary: Acute rheumatic fever is one of the chief causative agents of cardiac disease. This may not be apparent at the time of recession of joint symptoms, so that all patients need careful observation for at least three months following such an attack and six months periodical physical examinations thereafter.

Patients should not be discharged from the hospital unless the white blood count is normal.

All patients should be tonsillectomized at a reasonable period following the acute attack of rheumatic fever, if there is the least sign of tonsillar infection.

From our experience, we would conclude that immediate apparent effects of rheumatic fever are far less important than late results, which often cause marked valvular deformity, more common in the mitral, quite common in the aortic, and occasionally in the other valves.

(Thanks are due Miss Renaud, R.N., for assistance in gathering material.)

NOTE: The quotation beginning page 766 is from Rheumatic Heart Disease by Carey Coombs, M.D., F.R.C.P., London. William Wood and Company.

CARCINOMA OF THE LARYNX

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To those endowed with a practical sense of value comes the feeling that within the last decade research and clinical experimentation have brought forth certain measures which tend to control, if not actually eradicate, malignant disease of the larynx. In this particular field the laryngologists have advanced with striking rapidity. Carcinoma of the larynx with its one time 100 per cent mortality is no longer a reproach to laryngological surgery. We have learned the great importance of early recognition of malignant disease and the value of well directed surgical efforts. The application of this knowledge has reduced the mortality from an inevitably slow and painful death to something less than 5 per cent.

In the matter of etiology we are without scientific facts. We have long suspected that certain irritative stimuli such as chronic inflammatory changes, papillomata, granulomata and pyogenic ulcerations predispose to malignant degeneration. Within our own experience we have observed over a period of months or years the transition of a chronic laryngitis, a papilloma, or a chronic infective granuloma to a malignant lesion. To these predisposing or exciting factors the term "precancerous" has been applied. Obviously the term is a misnomer for there are no scientific facts which confer the privilege of assigning to these benign processes any of the characteristics even remotely akin to cancer. Though they may possess none of the histological manifestations of cancer, their predisposition to malignant change is frequently observed. The full recognition of this fact justifies the term "precancerous" since it not only warns of the intimate association of non-malignant and malignant disease, but emphasizes with force a truth so essential to early diagnosis and well directed treatment.

In this connection attention is called to the frequent occurrence of laryngeal cancer in individuals who practice faulty voice production. A review of our case histories reveals an amazing number of malignant lesions observed in the larynges of individuals who, for occupational or other reasons, habitually expose their vocal processes to the strain of overuse. In our series of 135 cases of proven cancer of the larynx, approximately 75 per cent occurred in public speakers, auctioneers, singers, teachers, preachers, salesmen, factory foremen, etc. That this class of patients had indulged in

overuse of the voice with its consequent abuse of the vocal apparatus over long periods of time appeared an outstanding feature in their histories.

It is my own conviction that continued strain of the larynx with its subsequent edematous and hyperemic changes in the vocal cords and laryngeal ventricles, is in no small measure a predisposing influence to the onset of malignancy, in individuals who have attained the cancer age.

That a chronic laryngitis secondary to upper respiratory infections, diseased tonsils, carious teeth, and chronic accessory sinusitis may predispose to laryngeal cancer is perhaps an assertion widely exposed to ethical differences of opinion. Nevertheless, we know from experience that a chronic laryngitis may eventuate in a laryngeal papilloma and that the latter has been observed to undergo malignant degeneration.

In the past four years, we have had under observation a man, aged 52, a lawyer by profession, who presented during his many visits to the clinic the characteristic findings of a chronic laryngitis. The clinical picture was constantly that of a benign process in both vocal cords until recently there appeared a papillomatous vegetation which revealed the early changes of malignant degeneration. For ten years his only symptom was hoarseness. Undue strain of the vocal cords consequent upon retarded function resulting from a chronic inflammatory process and the exigencies of his profession were in my opinion contributing factors in the development of a laryngeal cancer.

Of unusual interest, too, is a second patient, a male, age 38, who was frequently seen over a period of four years on account of a vegetative papilloma of the left vocal cord. The clinical features of his larynx were characteristically those of a benign lesion. Microscopical examination of many specimens of tissue continued to confirm this suspicion. Within the past year there appeared a sizeable mass in the left laryngeal ventricle. The extirpated larynx revealed a rapidly proliferating carcinoma involving nearly the entire half of the larynx.

Is there not then some justification for the opinion that there are a variety of conditions developing within the larynx which might be termed precancerous? Admitting that there is no scientific basis for such an assumption, does it not emphatically signify a truth which warns of the dangers of laryngeal irritation and calls for more diligent efforts on our part to dispose of those stimuli which are potential factors in the development of cancer?

No one can doubt the influence of lues upon malignant disease of the larynx. Many writers bear witness to the fact that cancer and gummata are closely associated allies. This is particularly true when the tertiary lesion of syphilis is permitted to run an uninterrupted course through failure to administer anti-luetic treatment. The behavior of luetic lesions as precancerous states is not definitely understood. Coplin gives a most logical explanation for this phenomenon and one that seems to describe adequately the relation of syphilis to cancer as it appears in our own clinical observations. It is his impression that there is no specific connection between lues and malignant disease but that the former liberates toxic substances which irritate the larynx, "frustrate repair and lead to a lawless cellular proliferation." It is a noteworthy fact that wherever there is a lesion which manifests the combined properties of destruction and constructive growth there obtains by the same token the elements which favor the wild proliferation of cells into neoplastic infiltration.

Assuming that the foregoing observations in respect to precancerous conditions can be logically accepted, what if any lessons of value have been added to our knowledge of prevention and treatment? The answer seems perfectly clear. The presence of papillomata and keratosis calls for surgical measures sufficiently formidable to dispose of them for all time. Tertiary lues of the larynx demands early recognition, and the prompt administration of antisyphilitic treatment. There is no type of lesion that lends itself more satisfactorily to complete eradication than gumma of the larynx when promptly recognized and adequately treated. The upper respiratory infections, infected tonsils, carious teeth, and chronic accessory sinus disease contributory to a chronic laryngitis should be properly eliminated.

If asked to limit laryngological therapeutics to but a single measure I would choose laryngeal rest to the complete exclusion of all other forms of treatment. There is no treatment so beneficial to chronic laryngitis, pyogenic ulcerations, and areas of

laryngeal edema as absolute rest of the larynx. By this is meant complete silence for a period of weeks or even months. The strict enforcement of this rule does not even permit the use of the whispered voice. It is demanded of the patient that he carry on all communications by signs or writing.

Time and again we have watched a nonspecific ulcer, a small nodule or a hyperemic area of thickened mucosa gradually shrink and finally disappear under strict vocal rest. No other therapeutic measure seems to be quite so effective.

My own personal experience with intralaryngeal medication has been decidedly disappointing. We are not yet convinced that any of the mild antiseptic solutions have a real therapeutic value and have already reached the conviction that the chemical cauterizing agents which have enjoyed some popularity in laryngeal medication are not only ineffectual but greatly add to the irritation; the very thing that we are endeavoring to eliminate.

The age incidence is similar to that of carcinomata occurring in other parts of the body. It is more common after the age of 40. In our series 75 per cent occurred between ages of 50 and 65. The youngest patient was 22 and the oldest 84.

We have often asked the question, Is not malignant disease becoming increasingly prevalent? The records of our clinic show a registration of a greater number of malignant cases each year. At a glance one might say that the normal growth of the clinic and the widespread publicity that has been given cancer through Public Health Departments and the innumerable societies for the control of cancer are responsible for the increasing number of registrations. To this we would agree were it not for the fact that we are seeing more and more younger patients between the ages of 20 and 30 with malignant disease of the upper respiratory passages. This observation which has been striking in our experience may properly give rise to the suspicion that cancer is becoming increasingly common.

From the standpoint of sex incidence it is a noteworthy fact that of the 135 cases studied, malignant disease of the larynx was observed in but 19 females. In our experience laryngeal carcinoma has been about seven times as prevalent in men as in women.

The onset of cancer of the larynx is insidious and except for hoarseness which often causes little or no alarm is almost invariably without other symptoms. Its presence depends upon the location and extent of the lesion. A new growth involving the supra- or infraglottic regions may attain considerable size before arousing suspicion that the larynx is the seat of malignant disease. When hoarseness does appear, its insidious development and common occurrence in practically all forms of laryngeal disease gives but little warning of the serious nature of the lesion present.

A review of our case records reveals in a striking manner the apparent trivial interest that is manifested in the initial symptom —hoarseness. Eighty-five per cent of the patients came for examination six months or more after the appearance of an altered voice. Fifteen per cent sought advice in the fourth or fifth month of their illness but in not a single instance could we discover that the patient had consulted a laryngologist until more than two months had elapsed since the onset of laryngeal symptoms. It is obvious therefore that in rapidly proliferating neoplasms of the larynx the lesion has already assumed serious proportions when the first laryngoscopic examination is made.

But what is still more discouraging is the fact that less than 50 per cent of the patients who have appeared at the clinic with operable cancer of the larynx, remain or return to accept the surgical recommendations which have been made. At first this appeared to be a sad commentary on our ability to inspire confidence so we set out to disprove or confirm this supposition. A careful check of fifteen patients registered in the clinic with proven carcinoma of the larynx who had disappeared and failed to return after laryngectomy had been advised, disclosed the astonishing fact that in not a single instance did the patient consult another surgeon. Many of this unfortunate group seeking conservative measures had placed their confidence in radiant energy or widely advertised serums only to despair in the late stages of malignant disease.

Later interviews with the relatives and friends of several of these unfortunate victims brought forth the assertion that their family physicians to whom these patients had returned were alleged to have advised against radical surgical measures. Some

truth, we believe, can be ascribed to this statement, for we are convinced that the general medical profession is not fully aware of the value of laryngectomy and laryngofissure in malignant disease of the larynx. Patients upon whom the operations have been performed remain employed in their various occupations and with few exceptions continue to serve as useful citizens for many years.

Pain referred to the pharynx or ear occurred only in those cases where a mass of considerable size with edema and infiltration of the surrounding tissues was discovered. Purulent and blood stained expectoration, dyspnea and dysphagia appeared as late symptoms of the disease. Sixty per cent of our series presented a number of latter symptoms; evidence that they were in extremis and beyond surgical relief.

Metastasis occurred as a late development in the cases studied. Only 12 per cent revealed palpable cervical glands which were considered clinical evidence of metastasis. Radiographs of the chest were taken in 10 cases where it was believed that metastasis had taken place, on account of the patient's extreme condition, but in only two instances were pulmonary carcinomas found. Six autopsies were performed. Three patients died of bronchopneumonia and lung abscess and were free from metastasis. One showed metastasis to the deep cervical lymph nodes of the anterior chain and in another case both the cervical glands and the lungs were the seat of malignant invasion. One postmortem revealed a malignancy of the prostate gland as well as of the larynx, but microscopical examination of the new growths demonstrated that the neoplasm in the prostate was a primary adenocarcinoma, while that of the larynx was a primary squamous cell carcinoma, each developing independently of the other. Clinical observations as well as postmortem examination would seem to substantiate the opinion that metastasis is usually a late development in the course of malignant neoplasms of the larynx. If this is true the urgent need of the day is an early diagnosis and a surgical technic that will completely dispose of the primary focus.

In my series of thirty-six patients now living and well following total extirpation of the larynx, not a single individual has expressed a desire to die rather than live a speechless life. These patients appear for frequent observation and the wonderful morale which they exhibit is a striking feature of their lives. In my experience with patients who have had radical laryngeal operations, the only evidence of despair that I have observed has emanated from the family doctor, who sometimes accompanies the patient on his visit to the hospital. This remark is not made with facetious intent. It is simply prompted by the conviction that many of our profession are thoroughly unfamiliar with the results of laryngectomy and the sociological aspects surrounding the patient who is living without a larynx. It is not generally understood that there is probably no organ in the body affected by malignant disease that lends itself so satisfactorily to surgical treatment as does the larynx. Through rapid perfection in operative technic, the mortality has been reduced from 100 per cent to approximately 3 per cent. With few exceptions, the patients rapidly acquire a distinctly audible whisper through forcible movements of the tongue and lips. Their expectancy of life is indefinite and their vocations many and useful. To concede that radical laryngeal operations have a place of merit in our surgical armamentarium is to admit that the patients at least have the right to a thorough understanding of the facts, and the privilege to make their own choice between inevitable death on the one hand and a voiceless existence on the other. To deny this fact is, I believe, a definite reproach to our methods of practice.

The diagnosis of laryngeal cancer is not always simple. It is not infrequently mistaken for other ulcerative processes within the larynx, notably tuberculosis and syphilis, although a thorough clinical study of the case in question usually reveals the true identity of the lesion.

In this connection there is one point concerning which I wish to be emphatic. I am unreservedly opposed to performing a radical operation upon the larynx in the absence of a pathological diagnosis. No doubt there are expert laryngologists who merit the assurance that they can depend entirely upon laryngoscopic examination for a correct diagnosis of the lesion in question but to me this practice is fraught with unnecessary hazards. To be sure there is a wealth of scientific evidence to prove that a malignant neoplasm once disturbed is prone to proliferate with increasing rapidity, but to

assume that this behavior is an uncontrollable one within the larynx is, I believe, a much overrated supposition. The time required for a pathological diagnosis does not usually exceed twenty-four hours, and it is doubtful that laryngeal neoplasms which ordinarily metastasize late in their development are influenced beyond control during the lapse of one day. It goes without saying, however, that complete preparation for operation should be made in order to avoid unnecessary delay following biopsy.

In relating one of my early experiences, the value of microscopical study in lesions of the larynx appears obvious. A male, age 42, appeared at the clinic 13 years ago on account of hoarseness and a pain radiating into his left ear. Examination revealed a large indurated mass occupying the left half of the larynx. A tentative diagnosis of cancer was made and the members of the staff were in full accord. The patient refused a biopsy. He has been seen in the clinic semiannually for the past 13 years and there have been no visible changes in the character or the extent of the lesion since the day of his first visit. He continues daily to follow his vocation and appears to be enjoying the best of health. In this experience, and in several others the hazards attending a clinical diagnosis not confirmed by histological studies have been truly emphasized.

It must be remembered, too, that a pathological examination does not always clear the diagnosis. When the tissue submitted includes only the superficial parts of the lesion and fails to contain its mucous membrane attachment the pathologists may find only histological evidence of a papilloma and report no signs of cancer present. In the writer's experience this error has occurred often enough to convince him that a negative report from the pathologist does not relieve the laryngologist of further responsibility in the case. The presence of suspicious clinical signs of malignancy should serve to leave the diagnosis an unsolved problem deserving of further study. A piece of tissue taken from the periphery of the lesion which includes its attachment to mucous membrane is likely to reveal under the microscope the true nature of the new growth.

TREATMENT

In the treatment of cancer of the larynx there is probably one premise to which laryngologists will agree, namely, that cancer without metastasis is controlled for an indefinite time or possibly cured when the primary lesion is entirely removed. If this is an accepted opinion, then how may such be accomplished? Of the available methods of treatment which one will we employ? The answer to this question is entirely dependent upon the character of the lesion in question. Is it a large fungoid mass deeply infiltrating the submucosa and pericondrium, or is it a small circumscribed lesion definitely limited to the superficial tissues and not advancing into the deeper structures of the larynx. Is it distinctly visible on or above the vocal cords or is it situated in the subglottic region more or less indistinct in the reflected image of the larynx in the mirror? These are some of the very obvious questions which necessarily confront the laryngologist when he is to pass judgment on the method of attack.

Laryngeal cancer may occasionally assume the character of an epithelioma similar to that found on the skin of the face or other cutaneous surfaces of the body. It may be of small proportions, slow growing, definitely limited to the superficial tissues and free from extensive infiltration. When such a lesion exists and is readily accessible from above, it is reasonable to assume that it may be successfully eradicated by direct or indirect laryngoscopy with biting forceps and cautery. It must be remembered that the indirected images of lesions viewed in the laryngoscopic mirror are usually much smaller than the actual lesion itself. The examination of the extirpated larynx frequently reveals a new growth one-third to one-half times larger than that seen as a reflected image in the mirror. A full appreciation of this fact is obviously important in selecting the surgical method of attack.

Most of us can bear witness to the fact that small malignant lesions of the larynx have been successfully destroyed in a few instances with laryngeal forceps and cautery by direct or indirect laryngoscopy. When the diagnosis is made early and the lesion is small and definitely confined to the superficial tissues, it is reasonable to expect that the biting forceps, cautery, diathermy, one or all of them, may occasionally destroy the entire new growth and render a cure. But how are we to know when we are dealing with such a lesion? This is the all-important question and one frequently difficult to an-

swer. Here again, I believe, we must return to the methodical methods of practice and rely entirely upon the clinical behavior of the neoplasm to determine whether or not radical or conservative interference is necessary. Little can be gained from a microscopical study of cell type. If the pathologist can give us information referable to the extent of infiltration his report is of much value but to place great confidence in an analysis of cell type may lead to an error in judgment. Repeated observations and a careful study of clinical behavior is in the writer's opinion the most important guide in the selection of operation.

In our experience, X-ray and radium treatment of laryngeal cancer has been very discouraging. It has a devastating effect upon cartilage and in several instances we have observed an extensive sloughing of the entire larynx. The latter appears to be engulfed in a mass of exuberant granulations which when converted into fibrous connective tissue forms a complete stenosis. When such a process does occur the larynx is rendered a non-functioning organ and the surgeon left with no assurance whatsoever that the maligant process has been placed under control. Moreover, the destructive effect of radiant energy upon the blood vessels which supply the larynx and the surrounding tissues is invariably a great source of annoyance to the surgeon. Patients thus treated are usually poor risks for operation. Their tissues heal slowly or not at all, and, if fortunate enough to survive the surgical insult, the painful and protracted convalescence which they have suffered leaves them physically exhausted and financially depleted.

Once satisfied that we are dealing with a laryngeal neoplasm that demands radical surgical interference we have at our disposal the choice of two procedures, thyrotomy, with submucous resection of the tissue involved, or laryngectomy. While the former operation has the enthusiastic support of several laryngologists it cannot be accepted without reservation.

Thyrotomy or laryngofissure is an operation commonly recommended for those cases of laryngeal cancer in which not more than the anterior one-half of one vocal cord is involved. It is not a precedure of choice when the arytenoid region or the posterior extremity of the cord is the site of the lesion. Neither is it employed when opposing cord surfaces are affected or when the infiltration has extended into the anterior commissure. No doubt, small superficial lesions definitely limited to the anterior one-half of one vocal cord and not infiltrating the pericondrium can be successfully removed by this method. Though laryngofissure saves the voice and permits of normal breathing through the upper air passages, the number of recurrences is greater than following total removal of the larynx. One has only to study a microscopical section of a rapidly proliferating cancer of the larynx with its far reaching invasion of pericondrium to understand the difficulties often attending an attempt to destroy every vestige of cancer by removing but one-half of the larynx. Once thyrotomy has been utilized, total laryngectomy in the advent of a recurrence is seldom possible. Given these warnings it would seem less speculative and more in keeping with good judgment to completely extirpate the larynx in those cases where there is clinical or pathological evidence that the neoplasm has invaded the deeper structures. By such a method alone can the surgeon have reasonable assurance that every ramification of the new growth has been removed.

The most important contraindication to laryngectomy is malignant metastasis. Several laryngologists have emphasized with force the crying need of careful metabolic estimations, functional tests of the kidneys, cardio-vascular examinations, etc., and in the face of abnormal findings have advised against the laryngectomy. It is obviously unwise to operate upon the patient who is so nutritionally impoverished or constitutionally undermined that the mere administration of an anesthetic is a grave risk to his life, but too much importance must not be given to those constitutional diseases which are so frequently the more or less normal effects of advancing years. The general surgeon does not expect all of his gallbladder and prostate patients to have normal cardio-vascular-renal systems and metabolic rates, neither should the laryngologist insist upon such ideal conditions when dealing with so grave a malady as laryngeal cancer. When the patient's condition will tolerate any major surgical insult he is by the same token a good risk for laryngectomy.

Prior to operation the patient is thoroughly digitalized. In this we are particular to follow the rule of administering 25 to 30

mgs. of digitalis folia per kilo of body weight. Since the average patient eliminates the drug at the rate of 100 mgs. daily beginning the first day of administration, we continue after digitalization to give the maintenance dose of 100 mgs. daily for an indefinite time.

Too much emphasis cannot be laid on the importance of careful postoperative attention. Preparation is made to combat shock and the patient is placed in bed, with lower extremities elevated and shoulders lowered for the first 24 hours after operation. The second day less elevation is maintained and as soon as possible the patient is raised into a semi-reclining posture and encouraged to change his position frequently.

Every possible care should be taken to prevent the drainage of secretions into the trachea. Two special nurses trained in tracheal work are in attendance with a suction apparatus available and every inspiration is guarded against the possible introducton of discharges into the lower air passages. Narcotics are withheld in order that nothing may interfere with the normal protective reflexes of the trachea.

The dressings wrung out in iodoform emulsion are changed every three or four hours. The tracheal cannula is wound in conical form with bismuth subnitrate paste tape and firmly introduced into the trachea that secretions may not drain along the walls of the tube into the lower air passages.

The patient is fed through a rubber catheter, introduced into the esophagus through the nose, and every effort is made to keep his nutritional requirements adequately fulfilled.

ANESTHESIA IN HEAD AND NECK SURGERY: VARIOUS TYPES AND METHODS

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The basic principles of anesthesia in surgery of the head and neck are not different from those in surgery of other parts of the body. The same anesthetic agents, or combination of anesthetic agents are employed, as in general surgery. The anesthetist must use the same care in the preoperative study of the patient, and in the selection from his armamentarium of anesthetic agents, the drug, or combination of drugs, which in his judgment would produce the most satisfactory anesthesia with the least possible amount of damage to the tissues of the case in question, as in general surgery.

It is necessary, however, in many cases of surgery of the head and neck to employ a technic which will allow the maintenance of the anesthesia to continue without interference by the anesthetist with the field of surgery, or with the operator.

In many phases of head surgery where the face is covered with sterile draperies, the anesthetist will have to judge the degree of the anesthesia and the condition of the patient by observing the respiratory excursions, color of the blood in the surgical field, character of the pulse at the wrist, color of the hands and finger nails, and by the reading of blood pressure at frequent intervals. If an eye is exposed, the anesthetist may request the surgeon to raise the lid or he may use a sterile applicator and raise the lid himself, and thus observe the eyeball and pupil.

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ANESTHETIC AGENTS

The anesthetic agents used are ether, nitrous oxide and oxygen, ethylene, ethyl chloride, tribromethyl alcohol or avertin, and sodium iso-amyl-barbiturate or sodium amytal. Ether may be used in the open mask drop method where the mask does not interfere, or by the closed method as per Ben Morgan apparatus or as ether vapor as per motor or compressed air method or by intratracheal insufflation.

Ether drop method needs no description.

Ether closed method.—The closed method we are using at Blodgett Hospital is by means of the Ben Morgan apparatus. With this apparatus N_2O-O or N_2O-CO_2 or Ethylene-O, Ether sequence can be used, thus avoiding the unpleasant sensations of induction produced by ether alone, and a surgical anesthesia may be induced in a period of about five minutes. The carbon dioxide gas which accumulates in the rebreathing bag may be filtered out by means of the attached drum filled with soda lime, which reduces the increased respiration necessarily produced by rebreathing. Oxygen, CO_2, N_2O, cylinders are attached to the apparatus and any of these gases can be utilized during the anesthesia if required. By means of this method the face mask may be used, but in cases where a mask would interfere with the surgery a Buchanan rubber air-way is inserted in the mouth reaching to the pharynx. The mouth is then thoroughly packed with strips of gauze around the air-way, compelling the greater part of the inspired and expired air to pass through the airway. This airway is attached to the Ben Morgan apparatus, thus permitting the anesthesic to be administered without interference with the surgical field. We find this method very satisfactory in cases where a face mask cannot be used.

Ether vapor, by means of an ether hook, is employed in operations in the mouth, as in tonsillectomies, or by means of a catheter which may be inserted into the pharynx through the nose. A second catheter may be inserted through the other nostril, thus allowing free ventilation, as exhalation may be obstructed by the dropping back of the tongue or by the tongue being pushed back by the surgeon, as in cleft palate operations.

Intratracheal insufflation. — The intratracheal method of ether anesthesia may be substituted for the intrapharyngeal technic. This method, I believe, is a splendid technic in many cases of surgery of the head and neck, and assures perfect ventilation, complete freedom of interference by the anesthetist in most operative procedures of the head. It requires considerable experience to be able to visualize the larynx by means of an electric laryngoscope and to introduce the catheter into the trachea. The lower jaw must be thoroughly relaxed and absence of spasm of the larynx is desirable. The use of open end varnished silk woven laryngeal catheters, varying in size from Nos. 16 to 32 F, depending upon the age of the patient, are preferable to ordinary closed tip catheters, or the Flagg flexible metal intratracheal tubes may be used. The catheter is inserted about 22 cm. from the teeth in an adult, and a shorter distance in younger subjects. Ether vapor may be introduced into the catheter by means of compressed air flowing through an ether bottle, or by means of the Flagg method which we are using. This method consists of an empty 8 oz. ether can in the top of which 4 or 5 one-half inch perforations are made, and one end of a large calibered rubber tube is fitted over the neck of the ether can and the other end of the tube is attached to the intratracheal tube. About two ounces of ether is placed in the ether can; the patient exhales into the ether can and inhales ether-laden air. If a more profound anesthesia is desired, agitation of the ether can will increase the ether content of the inspired air. If a lighter degree of anesthesia is desired the tube is detached from the intratracheal catheter, thus withdrawing the inhalation of ether until the depth of anesthesia is reduced to the degree required. If there is a collection of mucus in the intratracheal tube, a small catheter is inserted into the intratracheal tube and the mucus aspirated.

Nitrous oxide oxygen gas. — Nitrous oxide oxygen gas can be employed in most cases where a face mask can be used. In tonsillectomies and in oral surgery a nasal inhaler is used. In intra-nasal operations a mouth inhaler is used.

Ethylene gas.—This gas we have discontinued on account of its explosive possibilities.

Ethyl chloride.—Ethyl chloride must be used with the greatest precaution. It is useful in children in very short operations as in paracentesis of the ear drum, or opening an abscess, or as an ethyl chloride ether sequence.

Sodium amytal.—The first preliminary report on the use of sodium amytal to produce general anesthesia was made by Zerface and McCallum, of Indianapolis, in 1929. It has since been used by many men throughout the country, and was received with a great deal of enthusiasm. This enthusiasm has now somewhat abated for the reason that several unpleasant sequelæ have been observed during and following its use. A marked drop of both systolic and diastolic

blood pressure has almost universally been found during its administration. The drop in systolic pressure varied from 30 or 35 mm. to 150 mm. of mercury, the greatest drop in systolic pressure occurring in the hypertension cases; the blood pressure, however, recovers partially during the surgery. There is also a depression of the respiratory center, as it is frequently observed that the respirations become slower, and this depression may continue for several hours during the sleeping period following the surgery, which necessitates careful watching of the patient during this period. The patient exhibits more or less restlessness upon recovery from the sleep, which restlessness is very undesirable in the immediate postoperative state in many surgical proceedings. This restlessness may be controlled by the use of morphine.

Sodium amytal must not be considered as a complete anesthetic agent. Supplemental anesthesia is necessary in the majority of cases, although the amount is very much reduced. The oxygen content in the supplemental nitrous oxide or ethylene may be increased to 25 and sometimes 50 per cent, and the amount of ether used as a supplemental anesthesia is greatly reduced. It has the advantage that the anesthetic may be administered in the room, in the nervous type of patient, thus allaying the fear of the anesthetic and of the removal to the operating room, and simplifies the administration of the general anesthetic. It is administered intravenously in 10 per cent solution and is given at the rate of 1 c.c. per minute. The patient is carefully observed as to the approach of sleep, which frequently comes on after 3 to 5 c.c. of the solution have been injected. The blood pressure is carefully watched and when the fall in pressure becomes great the injection must be stopped. The usual dose varies from 10 to 15 grs. and never should exceed 22 grs. The drop in blood pressure may be combated by the use of adrenalin, ephedrin, or caffeine sodium benzoate. It should not be used in cases with a low blood pressure.

A local anesthetic may supplement sodium amytal, and the toxic effects of the local anesthetic, which are sometimes observed, are neutralized by the sodium amytal, although Emge and Hoffman[2] have observed restlessness following injections of novocaine in amytal cases, which they believe is due to the antagonistic action of the two drugs.

Tribromethylalcohol. — Tribromethylalcohol, with the trade name of avertin, was first presented before the Berlin Surgical Society in 1925, by Butzengeiger,[3] and was introduced into this country by Joseph R. Gutman, of Chicago. Over 250,000 cases of its use have been reported in the literature. Tribromethylalcohol must also not be considered as a complete anesthetic agent. It is given rectally in 3 per cent solutions. It is presented by the manufacturer as avertin fluid, 1 c.c. of which contains 1 gram of the drug. The dose recommended for basal anesthesia is 0.1 c.c. of avertin fluid for every kilo, or 2.2 pounds, of body weight.

The manufacturer supplies a dosage and weight table from which may be ascertained the dose required for a given weight, and the amount of water required to make the 3 per cent solution. The patient must be weighed previous to the injection, and a cleansing enema must be given the night before, or several hours proceding the operation, so that the anesthetic solution will not be diluted by the fluid in the bowel. Great care must be taken in the preparation of the solution; the temperature of the water should not be below 95 degrees F. or above 104 degrees F. The required amount of distilled water at the proper temperature, with the avertin solution added, is placed in a flask and is thoroughly agitated until the avertin fluid has been thoroughly dissolved in the water. It is necessary to test this solution for decomposition as crystallization of the drug may take place when the temperature of the water is lower than 95 degrees Fahrenheit. When the temperature of the water is above 104 degrees F., hydrobromic acid and dibromacetaldehyde are formed, which have a marked irritating action upon the intestinal mucosa. The mixture is therefore tested for decomposition by taking a few cubic centimeters of the mixture and adding two drops of a congo red solution; if the solution with the congo red added is of an orange color no decomposition has taken place, but if it turns a blue or violet color decomposition has taken place and therefore it must not be used. It is necessary to inject the solution immediately after its preparation and not allow it to cool. It is injected into the rectum very slowly by means of a catheter and funnel, allowing about five

minutes for its injection. About the time the injection is completed, the patient will show signs of drowsiness and in 10 to 15 minutes is profoundly asleep. The respiratory center is depressed and respirations become somewhat slower and shallower. It is necessary to assure free pulmonary ventilation at all times as an obstruction to respiration may be caused by relaxation of the pharyngeal muscles and the tongue dropping into the pharynx. This can be accomplished by the introduction of an airway. There is some depression of blood pressure, usually 10 mm. to 30 mm. of mercury.

Supplemental anesthesia is induced by means of nitrous oxide and oxygen, allowing usually 25 to 50 per cent of oxygen, or a very light ether anesthetic. The narcosis lasts from one to two hours, and the patient awakens without restlessness and goes into a secondary sleep which continues for several hours following the first recovery. A local anesthetic may be combined with the avertin anesthesia. I believe that most operations on the head and neck may be performed with this method. Avertin has all the advantages of sodium amytal without its disadvantages. It must not be used in cases where there is an obstruction to respiration as in tumors pressing upon the trachea or in ulceration of colon or rectum. It is eliminated by the kidney and therefore in severe cases of nephritis it may be contraindicated.

SURGERY OF THE NECK

Among the principal operations performed upon the neck are thyroidectomy, block dissection, plastic operation for scar contractions, tracheotomy and laryngectomy.

In the simple thyroidectomies, such as enucleation of the thyroid glands in nontoxic adenomas, nitrous oxide or ether anesthesia per mask, or tribromethylalcohol, may be employed.

In the toxic thyroids greater care must be exercised in the administration of the anesthetics. The coöperation of the surgeon, the internist and the anesthetist is desirable. All cases of decompensated hearts should have the preliminary rest and digitalis to bring about compensation before surgery. All toxic cases should be prepared preoperatively by the use of iodine and rest. Many of these patients who are extremely nervous show a rapid heart and evidence of fibrillation. In some of these cases after careful preparation a pulse rate of 150 or over may continue after surgical anesthesia has been induced. In such a condition it may be wise for the surgeon to be content with a simple tying of the superior thyroid vessels, or with the removal of one gland and delay the removal of the other gland to some later date. These operations may be done under ether, nitrous oxide or tribromethylalcohol anesthesia.

Some of these toxic thyroid patients are extremely nervous, apprehensive and have a fear of the anesthetic and of the operation. In such cases these patients may be relieved by administering the anesthesia in the room after a preliminary quieting dose of morphin. Tribromethylalcohol would be the anesthetic of my choice, which may be given as a sham enema, so that the patient will have no knowledge of leaving the room or of the operation until several hours after returning to the room.

Some surgeons require light anesthesia in thyroidectomies in order that phonation may be present to ascertain injury to the recurrent laryngeal nerve, and coughing or retching may be induced by mechanical irritation of the pharynx, to ascertain bleeding points. When the pressure of the thyroid gland upon the trachea has been sufficient to produce softening or absorption of the tracheal rings, intratracheal anesthesia or the introduction of the intratracheal tube when collapse occurs is beneficial.

A sterile towel twice folded lengthwise placed around the chin of the patient with the open folds upward allows the anesthetist to place his hand between the open folds of the towel so that he may hold the mask and jaw without contaminating the operating field.

In block dissections of the neck, intratracheal or intrapharyngeal methods may be employed or tribromethylalcohol may be used per rectum. The same methods of anesthesia are satisfactory in plastic surgery for scar contractions of the neck.

Tracheotomy.—In my opinion the best anesthetic in tracheotomy is nitrous oxide oxygen. There is usually a marked cyanosis present due to a respiratory obstruction. Nitrous oxide plus a large per cent of oxygen, or pure oxygen under pressure, will restore the color.

The anesthetic of my choice in laryngectomies would be nitrous oxide oxygen or

ether until the larynx is opened and after the larynx has been opened an intratracheal tube is inserted into the trachea and ether anesthetic continued through the intratracheal tube or the rectal use of tribromethylalcohol

OPERATIONS OF THE HEAD

Tonsillectomies. — Either ether or gas may be employed. In ether anesthesia the patient is well anesthetized by means of the ether mask, after which the ether hook is substituted and the anesthesia continued in this manner. When tonsillectomies are performed under nitrous oxide anesthesia the nasal mask is applied with exhalation valve open, a mouth prop is inserted between the teeth and a wet towel, a piece of rubber tissue or a rubber cup is placed over the mouth which prevents the patient from breathing air through the mouth. When the patient is properly anesthetized, the covering from the mouth is removed, the exhalation valve is closed, and the pressure of the gases is increased so that the anesthesia may be of sufficient depth to produce an automatic breathing without expiratory holding. Ether may be added to the nitrous oxide if the gas anesthesia is not satisfactory or sufficient.

In all cases of tonsillectomies the throat must be thoroughly aspirated to prevent aspiration of blood. This is particularly true when the operation is performed in the sitting posture. It is desirable to have a cough reflex present during the surgery, as the properly anesthetized patient ordinarily will not cough unless blood enters the trachea, which cough will expel any blood that may enter the trachea. Some surgeons prefer to have no cough reflex present and in such an event thorough aspiration is required at all times. It is my opinion that aspiration of blood into the lung may occur post-operatively as well as during the operation, therefore it is important that the patient lie on his side when placed upon stretcher and bed to facilitate free drainage.

In the modified Killian tonsillectomy position, the body of the patient is inclined forward so that the blood will flow away from the pharynx and out of the mouth. This position is ideal from the patient's standpoint, but it is an uncomfortable one for the surgeon as it is necessary for him to use a low stool or to incline on his knees to perform the operation.

Extractions of teeth and operations of the jaw may be performed under nitrous oxide and oxygen gas.

In mastoidectomies, either simple or radical, nitrous oxide oxygen, ether open drop method or tribromethylalcohol may be employed. It is well for the anesthetist to watch the face for any muscle contractions which may develop while the surgeon is operating in proximity to the facial nerve.

In rhinoplasties and sinus operations, such as radical frontal, sphenoid, ethmoid and antrum operations, either intratracheal or intrapharyngeal ether, or tribromethylalcohol may be employed.

Brain tumor.—When we are asked to anesthetize a patient with brain tumor, we always know we are dealing with a hazardous case. Since the increased intracranial pressure interferes with the centers of respiration and circulation, we must be prepared to meet any emergencies as they may arise. It is best not to administer any preoperative narcotic as the respiratory center may become still more depressed. The use of atropin alone as a preoperative medication is sufficient to overcome the irritative action of ether on the air passages. Ether administered either by the intrapharyngeal or intratracheal route is the anesthetic of my choice. The anesthetist will have to be removed from the field of surgery. The blood pressure readings should be taken frequently. The mental state of the patient is usually at a low level and, if the intratracheal method is used, very little anesthetic is required after the introduction of the intratracheal tube. A slow pulse and an elevation of blood pressure may be present due to an increased intracranial pressure. After the lifting of the bone flap the intracranial pressure is partially relieved and the pulse rate will increase in rapidity and the blood pressure drop. This is particularly true when the dura is opened. In cases where the intracranial pressure has been considerably increased, there may follow a marked drop in blood pressure and the pulse become rapid and small. This is due to the sudden removal of the intracranial pressure. In event that this occurs, it is of benefit to request the surgeon to put pressure on the brain in sufficient amount to partially restore the intracranial pressure, which may have a beneficial effect upon the lowered blood pressure.

Pre-anesthetic adjuncts.—These are given as in general surgery.

In young children, atropine alone is used in ether cases. In older children codeine and atropine, or small doses of morphine and atropine.

In adult cases 1/6 gr. to 1/4 gr. of morphine and 1/150 gr. of atropine, or morphine 1/6 gr. to 1/4 gr., and hyoscine 1/150 gr. is given. These adjuncts should be administered 45 minutes to one hour before surgery. Tribromethylalcohol is usually preceded by 1/6 to 1/4 gr. of morphine and atropine 1/150 gr.

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SIGNIFICANCE OF CARDIAC PAIN

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Pain is a most difficult word to define. Specific in its meaning, it depends primarily on subjective interpretation. The reaction of the individual to discomfort produced by pain makes it a relative term that varies with its quality, degree, and character. Pain developed on bodily surfaces is more readily interpreted than pain springing from tissues within the body. The former arises from direct irritation of afferent central nervous system fibers; it is more readily localized. The latter developing through connections of the sympathetic system is often more difficult to understand; it is associated with greater areas and may be widely diffused. In this discussion we are concerned with pain arising in the deeper tissues, chiefly with that form developing in a body viscus, the heart. Cardiac pain, as is well known, defies accurate description. Heberden originally spoke of it as "An intense substernal discomfort accompanied by a sense of strangling." He believed it to be a "cramp of the heart muscle." Albutt says, "Let us remember that . . . it is the horror, not of a crushed thorax, not of the bottomless pit, but of the garotte."

Sutton and Leuth have recently investigated cardiac pain. Their work in animals constitutes the most definite study that has been done on the subject. Harvey, Haller, Lannander, Meltzer, McKenzie, Sherrington and others have shown that the viscera are themselves insensitive to pain. How pain may arise from a viscus has been described by Langley. Sutton and Lueth have gone farther and actually produced pain in varying degrees experimentally. The site of origin, all of the pathways of transmission, and the radiation, remain to be solved. Yet a great step forward has been taken toward the interpretation of cardiac pain.

Let us first understand that the endorcardium, myocardium, visceral pericardium and the great vessels arising from the heart are insensitive to pain. Sutton and Lueth have shown experimentally that narrowing, up to occlusion of the coronary vessels producing heart muscle ischemia, up to infarction, causes cardiac pain. This is in direct substantiation of clinical pathologic findings. In the present state of our knowledge this is as far as we can go, or should go. Clinical evidence is rapidly accumulating to establish the fact that physical signs and especially electrocardiography may reveal the source of true cardiac pain. Cardiac pain therefore is a symptom referable directly to the coronary arteries.

A diagnosis of cardiac pain is frequently made where the cause is not coronary disease. In such cases the more serious condition is mistaken for one less important to the patient. The final result is not likely to be fatal as the true factors involved are ultimately brought to light. When the situation is reversed, however, a grave error is often made. We refer to those conditions where so called indigestion, pleurisy, colitis, and neuritis involving the pectoral group or the arm and shoulder, are mistaken for coronary disease and faultily treated. Then

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too the ambitious surgeon now and then operates for cholelithiasis, appendicitis, acute ulcer, and even pancreatitis where the factor of cardiac pain has not been differentiated. This is a most important group in which neglect and error may be the direct cause of a fatal issue.

The internist is frequently consulted with regard to cardiac pain where the heart is not involved. The patient's anxiety or his mistaken idea of the location of the heart, or both, cause him to lose no time in seeking an opinion. Chest pain secondary to focal infection, distention of the stomach or colon, a pleuritis, esophageal spasm, vertebral arthritis, or a spinal cord lesion are among the numerous extra-cardiac conditions that may produce pain in the anterior and left lateral chest region. Examples are legion and their citation in this discussion would be superfluous. However, instances of the diagnosis of an inconsequential condition without the consideration of the likelihood of an intracardiac lesion may be cited. Such a case is the following:

Case 1.—A physician, aged 49, whose father and mother both died of angina pectoris. While the patient was walking up an incline of moderate degree, he felt a strange tightening sensation across his chest. Thirty-six hours later he again felt a return of what he called an indescribable intense fatigue, unbearable, and yet not sufficient to excite any fear of impending danger. The sensation, though not a sharp pain, was equivalent, he states, to actual pain. It radiated into both arms and shoulders. In forty-eight hours it gradually subsided. He was much distended and vomited once with relief. There was constant eructation of gas.

He moved to a lower altitude, thinking that the mountains where he was visiting had something to do with symptoms. Here he consulted a physician who found a low blood pressure, a rapid heart rate and râles in the anterior chest. His temperature was between 99 and 100. The physician made a diagnosis of mild bronchopneumonia and pleurisy and kept him at rest. He was seen by us two months later. His pulse was still about 100. His blood pressure 100/80.

The history suggested a coronary thrombosis with infarction, which diagnosis was strengthened by the physical examination, and the electrocardiograph revealed a typical curve.

Case 2.—Mrs. L. W., aged 70, at death. The patient was first seen in 1916, for cardio-renal disease. There was three plus albuminuria. She was seen on many occasions after the original visit and it was found that her blood pressure varied between 160 and 226 systolic and 90 to 140 diastolic. She had never complained of precordial pain. On July 26, 1928 she complained of feeling very bad and of intense pain in the right infra-clavicular region. At this time it was noted that her blood pressure had fallen from 15 to 20 millimeters from the previous reading a week before. An electrocardiogram taken on the third day of this illness revealed depression of the S. T. interval. She was put to bed with instructions to maintain absolute rest. Coronary disease was suspected, though the unusual location of the pain and the patient's general well-being did not lead us more than to suggest its possibility. Treatment was carried out, however, on this assumption. The patient spoke frequently of this as her last illness, though she never gave on direct inquiry any other hint of fear of impending death. The third day of her illness a slight elevation in temperature developed and then subsided. On the fifth day she suffered a sudden and severe attack of vomiting. There was no persistence of nausea afterwards. The nurse reported an increase of cyanosis and pulse rate during and for a short time after the emesis. On the seventh day the patient complained of epigastric pain and a sense of abdominal fulness. This persisted for about two hours when suddenly the patient vomited, had severe cardiac pain and died.

These two patients are cited because they represent borderline cases in which the more serious possibilities were not recognized at the beginning. In the former, the suggestive family history, the initial symptoms, the mildness of the suspected pulmonary condition, and the course should have created suspicion that a coronary lesion existed. In the latter, the suddenness and the intensity of the pain, the patient's anxiety, the total absence of signs of bone or joint involvement and the initial attack of vomiting should have suggested cardiac pain. In both of these cases an absolutely accurate differential diagnosis could have readily been made on the electrocardiogram alone as was subsequently shown.

In essential hypertension, particularly of the malignant type, cardiac pain frequently occurs. Numerous theories have been advanced to explain the origin of hypertensive heart pain. Sutton and Lueth, we feel, have disproven the often expressed theory that such pain originates from the stretching of the great vessels or heart cavities, for they were able to stretch these parts to the point of rupture without producing demonstrable evidence of pain. That here again the coronary arteries are at fault is without question. A typical case is the following:

Case 3.—Mrs. S. B., a nurse, aged 30, was first seen December 30, 1927. She stated that she had been in a train accident and, although she did not remember her head being struck, she was unconscious for several minutes. When she became conscious she felt as if her jaw had been driven through her head and as if her back had been broken. She was in the hospital six weeks with a condition that had been diagnosed as cerebral concussion. Ever since this accident she has had attacks of severe headache associated with a marked rise in blood pressure. Her blood pressure is at times as high as 295 systolic and 175 diastolic. Against advice, she at times engages in moderately strenuous physical exertion. Frequently when she does so, she has severe precordial pain and tightness across the upper chest. There is no radiation of the pain and it is not so severe that the physical exertion can

not be carried on. When last seen in our office, August 30, 1930, her blood pressure was 265 systolic and 170 diastolic.

In this case, there is presented no great difficulty in diagnosing true cardiac pain. In the presence of a hypertension one can scarcely ever be overcautious in suspecting cardiac origin of any chest pain which is accentuated by physical exertion.

The third type of case which we wish to present is illustrated by the following history:

Case 4.—Mr. J. A. W., aged 53, general insurance agent. This patient gave a history of having had some slight precordial distress occasionally for several years. Fourteen months before he was seen in our office he had an attack of severe chest pain and an unexplained temperature. He was in bed for three weeks without a proper diagnosis being made. An electrocardiogram taken two months after this illness revealed definite evidence of coronary thrombosis. He remained very well for a period of about ten months, at which time he returned to work. One week preceding his fatal illness, be avoided a serious automobile accident only by strenuous exertion on his part. He was seen three days after this near-accident, complaining of typical anginoid pain with radiation down the left arm. His blood pressure at this time was 170/100. Two days following, after his evening meal, he developed severe precordial distress, broke out in a cold sweat and went into a state of collapse. His condition when seen a few hours later, was very poor and he was suffering from intense pain in the upper chest, which was not entirely relieved by one-half grain of morphine. He had already told his family good-bye for he said he was going to die. At the time of this visit, cold clammy slightly cyanotic skin was evident, there were râles all over the lower half of each lung, the heart sounds were very faint, the blood pressure was under 100 systolic, extrasystoles were present and the pulse thready and rapid. The following day his temperature was 101 and remained at this level or higher until his death on the fourth day of his illness. The electrocardiogram was typical of coronary thrombosis. Autopsy revealed a complete occlusion of the descending branch of the left coronary artery with infarction of the apex and anterior wall of the left ventricle. An old canalized thrombus was found near the origin of the right coronary artery.

In this case, we have a classical example of coronary thrombosis with cardiac infarction. The history of previous precordial pain with one attack of coronary thrombosis, the sudden onset of his fatal illness, the fall in blood pressure, the persistent boring pain requiring large doses of morphine and lastly definite evidences by electrocardiogram, all point to the true nature of his disease.

Perhaps the best known example of cardiac pain is furnished by the cases of angina pectoris without coronary occlusion but with coronary sclerosis and with or without arterial hypertension. From our files may we cite the following history:

Case 5.—J. W., aged 76, retired baker. This patient was first seen June 5, 1928. His complaint was pain in the left arm and chest and some difficulty reading in that he could not apprehend what he read although he could see perfectly well. He also had some weakness in the left arm. His blood pressure was 160 systolic, 90 diastolic. For many months the slightest exertion brought on severe vise-like pain in the precordium radiating out the left arm. He has been markedly relieved by nitroglycerine and for months at a time by restricted activity and the administration of vasodilators has been free of pain. His blood chemistry, blood Wassermann, and electrocardiogram were all normal. When last seen his blood pressure was 160/100.

With these somewhat typical cases in mind, what then may we say are the cardinal points on which a true differential diagnosis of cardiac pain may be made?

1. That a careful history of the nature, duration, inciting factor, and location of the pain with its possible radiation, is of major importance, almost goes without saying. It is often possible, without ever touching the patient, to make a diagnosis of cardiac pain on the basis of a careful history alone. We are frequently astounded by the gross neglect of this essential detail.

2. In the physical examination, we feel that all the signs of arteriosclerosis should be carefully sought, for although coronary thrombosis and angina pectoris often do occur without demonstrable signs of a generalized arteriosclerosis, nevertheless they are most commonly found in arteriosclerotic individuals.

3. The blood pressure, with especial reference to the diastolic reading, is a very important detail. Well over 50% of the cases of coronary thrombosis have had a previous hypertension and the association of angina pectoris with simple coronary sclerosis and a previous or present hypertension is well known. We have mentioned the occurrence of chest pain in hypertension which is not of anginoid character. In coronary thrombosis, possibly the one most important finding is a blood pressure below 100 systolic or a sudden fall of blood pressure below a previous known level. We have been able to make a diagnosis of true cardiac pain on this basis alone, in two atypical cases of coronary thrombosis.

4. While physical examination of the heart and lungs sometimes closely approaches the normal, a cardiac dilatation, a

muffled first heart sound, and râles at the base of the lungs are of extreme importance in accurate diagnosis. We have followed carefully a case of severe cardiac neurosis with coronary sclerosis in whom we were most uncertain as to the true nature of the disease until the tone of the first heart sound became definitely softer and râles appeared at the base of the lungs. Sutton and Lueth have observed constant dilatation of the left ventricle immediately following experimental occlusion of the left descending coronary artery.

5. The electrocardiograph has perhaps done more to clarify the field of cardiac pain than almost any other factor. While in the present state of our knowledge, we must admit that coronary sclerosis may be present in severe degree without alteration in the electrocardiogram being present, nevertheless in many cases of simple coronary sclerosis electrocardiographic evidence is obtainable. During the last two years we have followed closely 19 cases of coronary thrombasis. Because of the availability of the modern portable electrocardiograph we have been able to make careful and repeated electrocardiographic studies in these 19 cases. There has not been a single case in which, sooner or later, definite evidence of coronary thrombosis with cardiac infarction was not found, electrocardiographically. In some cases the evidence was obtained as early as one hour after the complete occlusion; in one case such evidence did not appear until the end of 44 hours after the occlusion. In other cases several days had elapsed before the initial tracing was made. All of these 19 cases have been verified by subsequent history or by autopsy.

THE LARGE-HOLED HEAD MIRROR

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The examination of the ear, or of the larynx by the indirect method, appears to be so very simple, that many may take it for granted that it has always been so. And yet, like almost any method which has not been discovered accidentally, it has taken years and the efforts of many to establish the methods which are now used generally. It is interesting to learn the steps which have been taken in the course of time. I am especially interested in the development of the head mirror which is now in use, because, when I was an interne in the Massachusetts Charitable Eye and Ear Infirmary in Boston, from January 1, 1896, to April 1, 1897, I had devised a head mirror with a large hole in the center. This larger opening in the head mirror had a little history of its own. It had been constructed first in order to facilitate the dressing of mastoid wounds. I remember very well when Dr. Crockett used the mirror in the Infirmary. He was very much pleased with it, because there was much less strain on the eye. The opening was rather large. Gradually, in the course of time, I had the opening made somewhat smaller for general clinical work, so that a mirror with a hole of about 12 mm. is found by me, today, to fill the necessary requirements. Before that time, as the older practitioners will remember, a smaller hole, about 8 to 9 millimeters in diameter, was used. Although I had devised the mirror before April, 1897, the same was published not sooner than in 1899, in the transactions of the Michigan State Medical Society.

When I was in Berlin, in 1897-1898, I took a course with the famous professor Fraenkel, using my large-holed mirror. Fraenkel asked me where I got the mirror. I told him "in America." He seemed to be quite interested and mentioned, if my memory serves me right, that Musehold had used a head mirror with large opening in order to photograph the larynx. One thing is well established, to my satisfaction, namely, that the small-holed mirror was in general use until I introduced my mirror, so that, today, a mirror with a small opening is a great rarity. I remember to have seen, lately only one small-holed mirror used by a somewhat elderly specialist in Detroit. Of course, it might well be asked why one should be so much interested in such an apparently little affair. There are several answers to this

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question. In the first place, who is to decide what is a circumstance of little or great weight? Secondly, is it of such little importance, when practically everybody enjoys now the benefit of this apparently little change? Thirdly, it is a question of one's right. The famous professor of law, Jehring, has said that the person who forfeits his right, forfeits the right. I consider it to be a moral obligation on my part to insist that the right be observed. In order to illustrate this point, I should like to state that in one English textbook the first large picture showed a head mirror with a large opening. The legend stated that it was Horne's mirror. I wrote to the author and sent him the illustrated little article of mine (of 1899). I received the following communication: September 5, 1921. "I thank you for your note and pamphlet of instruments. I am interested to see how the idea of a large-holed mirror has arisen so long ago as 1899. Here it is known as Horne's Mirror, but it does not seem to have been first devised by him." In the next edition, the author called the mirror the Horne-Jones mirror, if I am correct. I have asked the author for an explanation, March 11, 1930, but have not received an answer. I would have been very much interested to learn why I have not received credit for my mirror on his part. Furthermore, while formerly instrument makers called the mirror, now in general use, the Amberg mirror, I cannot always find such a reference, lately. When I was in London, England, in 1924, and just happened to attend a meeting of the otolaryngologists, I saw a mirror with a large hole in the exhibit of Messrs. Allen and Hanburys, Ltd. I asked the gentleman in charge, who had devised the mirror with the large hole. He told me that he did not know. I sent Messrs. Allen and Hanburys some literature on the subject and received the following answer, dated December 18, 1924, in part: "We are returning herewith the 'Meyorwitz Bulletin' also the card from Dr..... and we are recording the fact that the Laryngoscope with large hole was invented by you. In the next edition of our catalogue the instrument shall be described as your design."

As everybody knows, new ideas develop from old ones. It is only natural that such a little step might have occurred to others. I intend, if possible, at some future time, to enter more thoroughly into the history of examination of the outer ear by the aid of illumination. In connection with the subject-matter I reproduce a letter which I have received from H. Pfau, the well known instrument firm, in Berlin, dated February 16, 1911. "In replying immediately to your inquiry I should like to say, that the reflector according to Musehold with an extra large opening, has appeared in my catalogue of 1898. In 1897, the author has shown the mirror in the Laryngological Society and has talked about the modification, after he had—perhaps end of 1896—called attention to his new reflector in an article concerning a special method of photography. From the year 1895 on, the mirror has been used privately by the author but was not published. I regret that I am unable to give you detailed information concerning the article of the author mentioned before. I, also, would not like to trouble Sanitaestrat Musehold, etc." This letter speaks for itself. A well known author of an American textbook on Diseases of the Ear wrote me, July 14, 1921, in part, "I am glad to have had my attention called to the omission of your name in connection with your head mirror. Should any other edition be called for, this error will be corrected." In conclusion, I should like to say that I do not intend to assume credit when credit is not due to me, but that I expect the same treatment from others.

FAMOUS MEN IN MEDICAL HISTORY

PHILIP SYNG PHYSICK—"FATHER OF AMERICAN SURGERY"*

CHARLES BELL

If we may project our thoughts back a century and a half, we see America in a state of turmoil, proud, clambering for independence, no longer willing to submit to the English rule. In spite of the conglomeration of nationalities scattered up and down the Eastern coast, there was beginning to appear a feeling of individuality—the colonists were beginning to consider themselves a power to be reckoned with, and one to be recognized by the mother country. Out of this spirit, whose flame was kindled by the domination of England, came the Revolution and the struggle for independence, crowned eventually by victory. The newly formed United States, however, a mere infant in politics, culture and science, was forced to look to the Old World Civilization for guidance and a start. The development of a new individual nationality, a unique American culture, was a matter of slow growth, and in spite of the independent attitude of our forefathers, they realized that it was still to the Old World that they must turn for guidance. Before the Revolution it was to Edinburgh and London that they turned. However, after the war, parallelling the growth of a new nation, there were beginning to appear men of a new type—a distinctive American type—who began to see things and make inquiries for themselves. For many years, the influence of London, Scotland, Paris, Vienna, was felt, but the Americans were beginning to realize that science is an individual matter, not a matter of geography. Among the early men whose influence was felt in American medical science and whose teachings were destined to model the form of future American medicine was John Hunter. His teachings were brought to America by Philip Syng Physick, the American mouthpiece of Hunter, known a little over a century ago as the greatest American surgeon of his day.

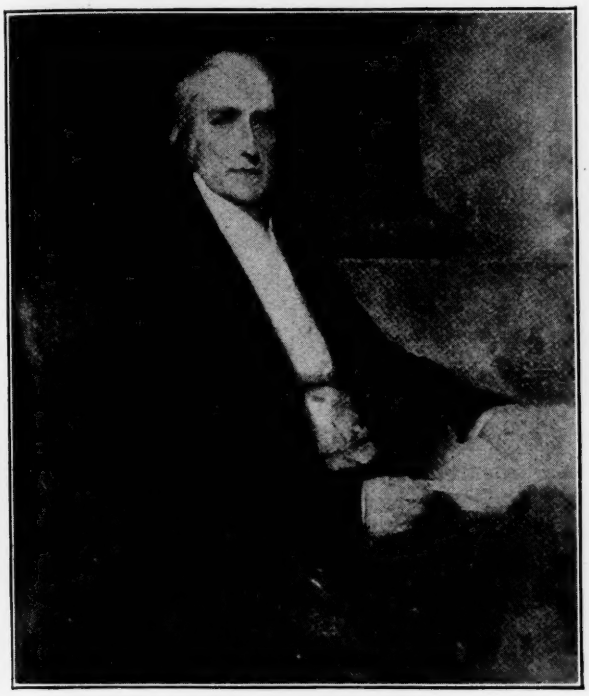
Physick was born in 1768, just before the Revolutionary War. His father was a certain Edmund Physick, receiver-general of the Province of Pennsylvania before the Revolution and agent of the Penn Estates after the war. His mother, daughter of Syng, a silversmith, was a woman of strong character. This couple decided early that their son was destined to be a doctor—whether or not the idea occurred to them because of the peculiarity of their surname is unknown. So they determined to give him the best possible education. In typical English fashion, Philip's father carried out his plan, in spite of violent remonstrance on the part of his son. Accordingly, Robert Proud, a local historian, was induced, at double pay, to tutor the young Physick. We know little of his life at this time, but judging from his later life, it was probably unexciting, full of hard conscious effort. Gross, his biographer, says of him at this time, "a faithful, scrupulous, toiling soul, something of a prig and not popular with his mates, but readily devouring any mental pabulum offered him, notably when, advised to read Cullen's first lines on the 'Practice of Physick,' he learned by heart all the dreary stuff."

From tutorship he went to the University of Pennsylvania, where he received his A.B. in 1785, at the age of seventeen. Philip greatly disliked medicine, the dissections and operations disgusted and offended him, and he begged his father to let him off, but to no avail. His father, a typical determined Englishman, would not change his plans for his son. Philip was a student in the office of Adam Kuhn, a Philadelphia practitioner, for three years, studying medicine with little enthusiasm, unintelligently, uninterestedly, but resigned to whatever was put before him.

In 1789, his father took him to London, where he was fortunate enough to be taken into the family of John Hunter. The opportunities for study thus opened to the young American were wider than in any other part of the World at that time. Hunter had collected the most extensive museum in existence, he had his own dissecting

*Read before the Victor C. Vaughan Historical Society, University of Michigan Medical School, January, 1931.

rooms, and he was surgeon to St. George's Hospital. Young Physick soon won the regard of Hunter, in spite of the contrasting personalities of the rough and ready Scotchman and the retiring, precise, prim Ameri-



Philip Syng Physick
1768-1837

can. There was no doubt about the fact that Hunter was a hard master, for he spared his pupils as little rest as he spared himself. The manner in which Hunter taught is well told in Grosse's "Eminent American Physicians and Surgeons." Physick's father asked what books it would be necessary for him to procure for his son. Hunter's answer was, "Then, sir, follow me; I will show you the books your son has to study," and leading him to the dissecting room, he pointed to several bodies, adding, "There are the books which your son will learn under my direction; the others are fit for very little." Young Physick took this advice very seriously, and applied himself very diligently to dissection, doing such neat dissection as to cause the favorable comment of his master. Further confidence was manifested when he was appointed assistant in experiments, which position required a trustworthy and accurate man. In other words, the pupil was growing rapidly in the favor of Hunter, so much so, in fact, that when the position of House Surgeon at St. James Hospital became vacant, Hunter used his influence in having Physick appointed to the vacancy. In the hospital he was able to put into practice the great principles his teacher had been expounding.

Among the men who had been pupils of Hunter, in his home, were Jenner and Kingston, while Home, Lynn, and Anthony Carlysle, though not living in the house, were received there quite intimately. Physick remained there two years and four months and was so well liked by Hunter that he was invited to stay on and share Hunter's practice. Had he stayed, he probably would have practised surgery mainly, giving Hunter more time for research. However, Philip Syng refused, for reasons unknown, abiding by his own carefully laid plans, and went to Edinburgh for a year, at the end of which time he received his M.D., at the age of twenty-four. Before leaving Europe, he received his license from the Royal College of Surgeons. Fortunately, for the good of American surgery, he felt a longing for his native city and returned to Philadelphia in 1792.

Young Physick, armed with a medical training of eleven years, which was exceedingly unusual for those days, and fresh from John Hunter, was expected to do great things in America, but he seemed to lack the personality or "push" of such men as Cadwalader, Barten, Shippen, Morgan, or Rush, who stepped almost at once into a good business. Accordingly, he spent three years almost without a practice. He managed to be appointed family physician to several prominent families, at a minimum salary, and thus was able to eke out an existence.

Like other American doctors of his day, such as Warren and Rush, Physick suffered continuously from ill-health. He had a wretched digestion, and, like many dyspeptics, he was pessimistic, reserved, and positively devoid of a sense of humor. He was a man of medium stature, pale, thin, with sharp, severe features. However, he was very sympathetic with his patients, if they were really suffering, but positively intolerant of any humbug or hysteria. He had small, delicate, nervous hands, and was very skillful in operating. Physick contributed to his own ill-health, breaking all the laws of hygiene. He ate irregularly, starved his body, hated sunshine and fresh air, never exercised, sleeping in a small, dark, "herme-

tically sealed" room. Despite his ill-health, he worked untiringly, arising at four and retiring at nine, never allowing himself to be called out at night.

He cared nothing for or knew nothing of art and literature, studied little science outside of medicine, and even read little of that after his student days. Politics was a bore to him. Nature meant nothing to him but a source of food and drugs. Physick was sure of himself—he was confident in his own ability—and was very distrustful of the work and accomplishments of others. He would never accept the word or theory of others until he had seen for himself. This is exemplified in his disgraceful treatment of Ephraim McDowell. After performing his first ovariotomy, McDowell wrote to Physick, recognizing Physick as one of the medical leaders of the day, asking him to publish his work, if he saw fit, in one of the medical magazines. Physick, however, simply ignored this "backwoods upstart," never even acknowledging his letter. These peculiarities grew on him, so that in his later days he was a very lonely old man.

In 1793, the year of his return from Europe, a terrible epidemic of yellow fever broke out in Philadelphia and Physick volunteered to help. He was appointed physician to the Fever Hospital at Bush Hill, where he might have done some very valuable work and made important contacts, had he not resigned the following day, being unwilling to serve with a certain Frenchman, Deveze. However, he worked faithfully in trying to combat the epidemic, taking very careful notes, doing as many autopsies as posible, and contracting the disease himself. In 1794, Deveze having left, he took service at Bush Hill Hospital and this position and his appointment to the teaching staff of the Pennsylvania Hospital, gave him his start. In 1796, he succumbed to the common lot, and married Miss Emlen, by whom he had four children. The following year, another severe yellow fever epidemic broke out, Physick was again stricken, and was bled to the extent of 176 ounces. The epidemic cost eleven hundred lives, among them nine physicians.

By 1800, he was lecturing in surgery at the University Medical School, Rush being among his admirers. Due to the politics of Rush, and an enmity between Rush and Wistar, the professor of surgery and gynecology at that time, a separate chair of surgery was created in 1805, and Physick was appointed the first professor of surgery. This position he held for thirteen years. It was said of his lectures, "For the first time here students heard something more than theory and a mere setting forth of operations and technic; they were taken to the root of things, and made to observe, deduce and record." Although delivered in a monotonous style, his lectures were so far-reaching and fundamental that his pupils spread far and wide the fame of the great surgeon and teacher. These lectures, which were Physick's greatest contribution to surgery, were never published, being almost lost with the telling. His biographer says of them, "He had now a wide field for the exercise of his powers, and was listened to by large classes in the University, through the members of which he could disseminate the principles of surgery, acquired from his celebrated preceptor, John Hunter, and strengthened and enforced by his own meditation and personal experience, obtained in hospitals and private practice."

The period from 1801 to 1825 was the busiest period in his life. After his election to the chair of surgery, he was recognized as chief of the surgeons of Philadelphia, or, for that matter, of any of the medical centers of the country. He made a large fortune and was given many honors, being the first American to be elected to the French Royal Academy of Medicine, and given an honorary fellowship in the Royal Medical and Chirurgical Society of London.

In the operating room he was unequalled, being especially skilled in performing lithotomies. One of his last lithotomies was performed on Chief Justice John Marshall, from whom he is said to have removed one thousand calculi, with a brilliant recovery.

Physick's philosophy of surgery was founded upon the conservative views of John Hunter, whose saying he must have often heard: "To perform an operation is to mutilate a person we cannot cure; it should, therefore, be considered an acknowledgment of the imperfection of our art." He first applied his philosophy in Pennsylvania Hospital in treating ulcers. "He directed the patient to be confined to bed and be kept strictly at rest, and in cases where the ulcer was situated on the lower extremity, he caused the limb to be considerably elevated. Constitutional treatment was

carried on at the same time, and soothing applications were made to the ulcer."

He also introduced modifications and improvements in the treatment of fracture, particularly that of Desault in the fractures of the thigh. By increasing the length of the splint, he produced more counter-extension, providing better immobilization and insuring greater comfort to the patient. He introduced a treatment of supra-condylar fractures of the humerus so that there was less deformity and more return of function. In orthopedic surgery, his inventive mechanism and originality helped him. His method of treatment of coxalgia is the basis for most modern methods of treatment. His appliance for outward displacement of the foot in Pott's fracture seems to have anticipated that of Dupuytren. In the treatment of dislocations, Physick believed in bleeding to the extent of inducing fainting, originally suggested by Alexander Munro of Edinburgh. His surgery was conservative and in practice he was guided by common sense, and was very intolerant of the theories and teachings of others.

Dr. Physick early suggested an improvement in the gorget, originated by Cline, used in the division of the prostate gland and neck of the bladder. Physick was very clever and ingenious in modifying and improving the instruments he used in his operation. For example, he made an extensive study of stricture of the urethra. In 1795, he devised an instrument for cutting strictures. It consisted of a knife concealed in a cannula, pressed down in the body of the cannula, then raised as the cannula was withdrawn from the urethra. He also introduced a method of passing a seton between the ends of an ununited fractured humerus, to stimulate callus formation.

He improved the instruments used in the removal of tonsils and hemorrhoids, inventing the tonsillotome. Physick was a pioneer in experimentation on absorbable ligatures. It was he who suggested to his nephew, John Syng Dorsey, the idea of using a buckskin suture ligature on a large artery in the horse. It stopped the bleeding and was discharged in a liquid state in two or three days.

Physick excelled in abdominal surgery, devising an operation for the cure of artificial anus by a lateral anastomosis, occasionally produced by gangrene from strangulated hernia of the gut. Dr. B. H. Coates describes the operation in detail: "The two ends of the intestine were found by examination to adhere to each other for some distance, in a form simulating a double-barreled shotgun. The next method, proposed by Dr. Physick, was to cut a lateral opening through the sides of the intestines, where they were adherent. By introducing his finger into the intestine by one opening, and his thumb through the other, he was enabled to satisfy himself that nothing interfered between them, but the sides of the bowel. He was then enabled without risk, to pass a needle, armed with a ligature, from one portion of the intestine into the other, through the sides which were in contact, about an inch within orifices. After about three weeks, concluding that the required union of peritoneum had taken place, an opening was made between the two portions of gut. By stopping the external orifice, the feces regained their natural route, the external aperture was afterwards healed, and the patient relieved from his most loathsome complaint."

The vast majority of these teachings and principles were contained in a two volume work by Physick's nephew, "Elements of Surgery," a well written treatise drawn largely from Physick's carefully written lectures on surgery. His nephew, John Syng Dorsey, lived only long enough to compile and publish this work, dying at thirty-four. Dorsey possessed many of those attributes which made his short life colorful, while Physick's was drab.

Gross, Physick's biographer, describes Physick as a "cold, dyspeptic, pessimistic, unsociable man, but full of sympathy for suffering humanity, strikingly erect, and handsome, but not pallid, his face was as if chiselled out of marble, his eyes black, and his hair powdered. Fond of money, but never claiming high fees, still he left nothing for the advancement of Science." Toward the end of his life, his peculiarities grew on him, and he became a very lonely old man. He left positive orders before his death that no autopsy be done on him, that his body be saved until decomposition set in, then buried and guarded for six weeks. Physick's life shows a moral lesson—the need in life of more than one ideal. His whole life and thought was the practice of medicine, and when he reluctantly gave that up, life was a hollow shell.

In spite of his shortcomings, Physick

was a great man. He was a physician as well as a surgeon. His great contribution to American medicine is that he raised American surgery from its somewhat low state and so developed that it soon became equal to the best surgery of Europe.

For more than a third of a century, Physick was the surgical mentor for thousands of students, and his surgical teachings, widely disseminated through his pupils and Dorsey's "Elements," pointed the way to greatly improved surgical practice. Probably no surgical teacher in America exercised so wide an influence as did Physick. He brought to America the surgery of John Hunter, and has deservedly received the appellation, "The Father of American Surgery."

MICHIGAN'S DEPARTMENT OF HEALTH

C. C. SLEMONS, M.D., Dr.P.H., Commissioner,
LANSING, MICHIGAN

INFANTILE PARALYSIS

An event that may be of more than immediate significance was the organization on August 22 of the Michigan Commission on Infantile Paralysis. It is made up of representatives from the State Medical Society, the University of Michigan, the Crippled Children's Commission, the Orthopedic Board, the Children's Fund of Michigan, the W. K. Kellogg Foundation, the Detroit College of Medicine and Surgery, the Wayne County Medical Society, the Detroit Department of Health, the Michigan Society for Crippled Children, and the Michigan Department of Health.

The Executive Committee of the Commission consists of:

Dr. C. C. Slemons, State Commissioner of Health, Lansing, Chairman.
Dr. J. D. Bruce, University of Michigan, Ann Arbor.
Dr. R. C. Stone, Pres., State Medical Society, Battle Creek.
Dr. J. D. Gordon, Detroit Department of Health, Detroit.
Dr. Stuart Pritchard, W. K. Kellogg Foundation, Battle Creek.
Dr. B. W. Carey, Michigan Children's Fund, Detroit.
Dr. W. J. V. Deacon, State Department of Health, Lansing, Secretary-Treasurer.

The plan of work of the Commission includes providing diagnostic assistance upon request and furnishing convalescent serum for treatment of cases.

The state has been divided into eight districts, with a regional consultant in charge of each district. A list of the districts follows:

District No. 1. All of the Upper Peninsula.
Dr. Moses Cooperstock, Marquette.
District No. 2. All of the counties north of the south line of Manistee, Wexford, Missaukee, Roscommon, Ogemaw, and Iosco.
Dr. Gordon B. Moffatt, Grayling.
District No. 3. Mason, Lake, Osceola, Oceana, Newaygo, Mecosta, Muskegon, Montcalm, Ottawa, Kent, and Ionia.
Dr. L. J. Schermerhorn, Grand Rapids.
District No. 4. Clare, Gladwin, Arenac, Isabella, Midland, Bay, Saginaw, Gratiot.
Dr. L. F. Foster, Bay City.
District No. 5. Huron, Tuscola, Sanilac, Genesee, Lapeer, St. Clair.
Dr. Lafon Jones, Flint.
District No. 6. Allegan, Barry, Van Buren, Kalamazoo, Calhoun, Berrien, Cass, St. Joseph, and Branch.
Dr. J. B. Jackson, Kalamazoo.
District No. 7. Oakland, Macomb, Jackson, Washtenaw, Hillsdale, Lenawee, Monroe, and Wayne (except the city of Detroit).
Dr. J. P. Parsons, Ann Arbor.
District No. 8. Clinton, Shiawassee, Eaton, Ingham, Livingston.
Dr. Earl I. Carr, Lansing.

These consulting physicians are prepared to go themselves or to send a physician who is capable of clinical diagnosis and doing spinal puncture if indicated. Any physician who desires this service should call the regional consultant of his district.

The collection of blood from convalescent cases for the preparation of serum is being handled for the most part by health officers and representatives of the Michigan Department of Health. The serum is distributed

at the discretion of the regional consultant. A payment of $10 is made to each donor. The serum is furnished only for pre-paralytic cases, upon a diagnosis confirmed clinically and by spinal fluid test. It is not for sale, and no charge is made for it, but those able to contribute toward its cost are invited to do so. The cost is from $15 to $20 per patient. The supply of serum is limited, and it is not given to cases already showing paralysis or for immunizing purposes.

One of the first activities of the Commission was the holding of a clinic on infantile paralysis on August 27 at Herman Kiefer Hospital. Between three and four hundred doctors from all over the state attended.

The work of the Commission is being financed jointly by State and voluntary agencies.

WHAT CAN BE DONE ABOUT MEASLES?

Physicians know that measles, including its sequelæ, is the cause of many deaths among young children. The deaths reported in Michigan from this cause during the last five years number 1,324. No doubt, many which were due primarily to this cause were reported as pneumonia or something else. The incidence is usually highest during the late winter or the spring months.

Relatively few physicians have so far considered the use of convalescent serum or of whole blood of an adult or older child who has had measles. It is difficult to secure and have available for distribution the convalescent serum. The whole blood of any one who has had measles has been found effective and the procedure is simple and practical.

If the child has been exposed to measles the disease can often be modified or prevented by the intramuscular injection of whole blood from a person who has had the disease. To assure protection, the blood must be given within four or five days after exposure. The degree of protection will depend upon the interval since exposure and upon the amount of blood given. *All children three years of age or less and any susceptible child to whom an attack of measles would be an unusual hazard, may well be protected by this measure.* Contraindications to the use of this method are the presence in the donor of tuberculosis, syphilis, malaria or any other communicable disease. One or the other of the parents or an adult brother or sister should be selected.

When the blood is injected within the first four or five days after exposure, the disease will usually be modified, sometimes prevented. If complete protection is not obtained, this dose generally prevents a severe attack. It may allow a mild form of the disease to develop, which establishes a lasting, active immunity.

Different bloods vary in their protective power. The age and size of the person receiving the blood also influence the amount to be injected. *It should be borne in mind that when complete protection is obtained the immunity lasts for a comparatively short time.* When partial protection is secured, evidenced by the mild attack of measles which follows, then the child is actively immunized and has a lasting immunity to the disease.

It is best to give the blood mixed with a sodium citrate solution. This citrate solution is put up sterilized, in ampules, by the Michigan Department of Health and furnished without cost to any physician.

Parents of younger children are being urged to take advantage of this way of protecting their children against a very dangerous disease.

C. D. B.

OF GENERAL MEDICAL AND SURGICAL INTEREST

ERGOT, IMPORTANT DRUG, RAISED ARTIFICIALLY

Ergot, one of the most important drugs used in medicine, may in future be raised artificially in the laboratories of pharmaceutical factories, instead of being harvested in the natural state as at present. Preliminary experiments pointing to this possibility have been carried out by Miss Adelia McCrea in the botanical laboratories of the University of Michigan.

The quality of ergot was the subject of a Senate committee hearing last June, as a result of charges that the federal food and drugs administration was allowing importation of impure and adulterated ergot. Miss McCrea's research raises the question of whether the growth of laboratory-raised ergot may not be so controlled as to insure a supply of the drug having a high degree of potency. It is too early, however, to consider practical applications of Miss McCrea's work, which is still in the realm of pure science.

Miss McCrea grew cultures of the fungus from which the drug is derived on a variety of media, including mashes and jellies made from various kinds

of grain, and simpler jellies containing different sugars. She found malt sugar to be the best food for the fungus. To get ergot to grow in a flask or test tube at all is regarded as a considerable triumph, because under natural conditions it is a parasite, preying only on living plants. She found it to be fairly modest in its food requirements, doing quite as well on a two or three per cent concentration of malt sugar as it did on six or eight per cent, and failing to thrive at all at higher concentrations.

It was greedy for oxygen, however, growing much faster when a stream of pure oxygen was passed through its tube than when it was given only air. But on a mixture of half oxygen and half carbon dioxide its growth was considerably retarded. It grew best at temperatures between 68 and 77 degrees Fahrenheit.

Light had a powerful effect on it. Without the shorter-wave visible rays—the blue end of the spectrum—it did not develop the purple color that is its most marked characteristic. Ultraviolet light, however, had no stimulating effect, and in repeated doses even retarded development.

Miss McCrea made physiological tests of the ergot growths she raised, and found that they produce most of the effects characteristic of natural ergot, though somewhat less powerfully. The reactions averaged from 40 to 75 per cent of those obtained with the same concentrations of natural ergot.

In making these tests, however, she had to use the whole vegetative growth of her cultures, for they did not produce the full-grown fruiting bodies which are the only source of commercial ergot at present.

Miss McCrea also made two attempts to infect growing grain with ergot, with the idea that its field cultivation might be undertaken. At present, commercial ergot is obtained solely by hand-gathering of wild growths on grain, especially rye, and wild grasses. Because of the great amount of hand work involved, and the high cost of labor in this country, American production of ergot is unprofitable. However, the field experiments did not yield particularly encouraging results, and Miss McCrea concludes that if it ever becomes desirable or necessary to raise ergot in this country the laboratory method is the more promising.—*Science Service.*

THE HOSPITAL, THE MEDICAL COLLEGE AND THE INTERN

A. C. BACHMEYER, Cincinnati, states that in many colleges, including the University of Cincinnati College of Medicine, the question of internship is the subject of a formal lecture to the students early in the senior year. The limited time permits only a brief discussion of the situation. The requirements of the college, the organization of the hospital, the importance of its primary function, the place of the intern in its organization, the need for the observance of its rules and regulations, and the necessity for exercising discretion, good judgment and self-control are emphasized. Lists of hospitals approved for internship by the American Medical Association and of those in which former interns have had service satisfactory to the college are published. In addition, there are personal interviews between the dean and other members of the faculty and the individual students. From these interviews, the dean or a selected member of the faculty may obtain an intimate insight into the student's plans and ambitions and be enabled to offer helpful advice or often to direct the student to the type of internship best suited to his needs and instruct him how to proceed in order that his plans may be best accomplished. Before the University of Cincinnati adopted the fifth year requirement, all its students, for many years, had voluntarily served internships of at least one year's duration. In recent years, however, an increasing number have planned to spend one or more additional years in clinical training. This desire is often developed in the course of the personal interview, and plans are formulated whereby such extended service may be obtained. Internships are therefore in demand in those institutions in which the opportunities for advanced training are best developed. In return for the many educational advantages and opportunities, the hospital has a right to expect that the intern will conscientiously devote himself to his duties, even to those that are uninteresting or of a routine nature; that he will conduct himself as a gentleman and as a full-fledged physician; that he will fit into his important but relatively minor place in the hospital organization in an harmonious manner, do everything in his power for the good of the patients assigned to him and refrain from doing anything that will in any way interfere with the best interests of the patient or of the hospital. If the college, the hospital and the intern will develop this attitude toward the subject of intern service, a solution of the many vexing difficulties of which each of them often complains can be hoped for and every internship can be expected to be of real educational value.—*Journal A. M. A.*

HIGH BLOOD PRESSURE AND LONGEVITY

David Riesman, Philadelphia, cites five cases illustrating the compatibility of hypertension with longevity. One of the cases shows that even the arteriosclerotic form of hypertension is compatible with fairly long life. These cases, however, do not alter the fundamental fact that high blood pressure is not a bodily virtue. It is necessary to pick out the good cases from the bad so that one may be able to say to a given patient whether he has a chance to live long or whether an early death awaits him and that he had better make his will. In teaching, not enough attention has been paid to the art of prognosis. It is by the skill in this art that the public often judges the medical profession. Some of the means the physician has of foretelling the future of the hypertensive individual are indicated. One must always correlate the blood pressure with the age of the patient. Old persons bear high blood pressure better than the younger ones. The height of the systolic pressure is not a reliable criterion unless it is excessively high. The patient's whole constitution must be weighed in the balance. More important than the systolic is the diastolic pressure. A high diastolic pressure is a bad prognostic sign. Heredity to a great extent determines longevity. Longevity as well as its opposite is largely an inherited trait. Not enough attention has been paid to this by geneticists, but it is as striking a familiar trait as the color of the eyes, the conformation of the head, or any other physical feature. Therefore, in a hypertensive patient who exhibits nothing else of moment save the hypertension, the prognosis is favorably influenced if he comes of a long-lived family. Much can be learned about a patient's general prospects by studying his temper and the influences that play on it. Irascibility is not conducive to longevity in the face of hypertension. The more fully a physician explains these matters to his patients, the better will be their coöperation. From the physical standpoint the prognosis is influenced by the size of the heart, the state of the arteries, the kidney function, the eyegrounds and the coexistence of diabetes.—*Journal A. M. A.*

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OCTOBER, 1931

"I hold every man a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves, by way of amends, to be a help and ornament thereunto."

—Francis Bacon

EDITORIAL

DO THE SIRES LIVE IN THE SONS?

Dr. W. J. Mayo said recently the practice of medicine apparently is satisfactory in Rochester if one judges by the number of children of members of the staff of the Mayo Clinic who are taking up the study of medicine. More than sixty-eight years ago his father, Dr. W. W. Mayo, who was a descendant of a long line of physicians, went to Rochester. Six members of his immediate family, two sons, and four grandsons, have carried on the tradition by entering the profession of medicine. This is all very interesting. It would be interesting also to know how sons react to their father's profession as a general rule, and, for us, how the situation in this regard prevails in Michigan. Sixty-six out of a total enrollment of 574, or approximately eleven per cent of the students of the University of Michigan Medical School, are the sons or daughters of physicians. Only four and two-fifths per cent of the students of the Detroit College of Medicine and Surgery at the present time are sons of physicians. Medicine is apparently an unpopular calling for members of physicians' families. Many doctors of our acquaintance are either noncommittal in advising their sons to go into medicine, or they advise strongly against it; and more particularly since state medicine is so much talked of, the older members of the profession, who have been accustomed to a life of independence, are inclined to take a somewhat pessimistic view in regard to the future of medicine.

DOCTORS WILL FOLLOW

The economic depression is having the effect of checking the tide of urbanization which has led to huge cities during the past few years. It is now *ruralization;* if we may be pardoned for coining a term. As the *Manufacturers Record* phrases it, "the breadline and the free soup kitchen are not features of farm life." Government records indicate that during 1930 a total of 1,392,000 persons left the towns and cities for the farms, the largest movement in this direction in ten years. The exodus from the farm to the city has declined proportionately. The farmer is assured of three meals a day and a place to sleep, and, to the advantage of those returning to the land, farms have not been so cheap in many years.

We have heard much about the unequal distribution of doctors and the tendency for the larger centers of population to be oversupplied, while in many rural localities it has been found necessary to subsidize physicians to get them to locate in the more sparsely settled portions of the country at all.

Should the trek to the farm become general, doubtless this very act of shifting population will automatically take care of the distribution of doctors.

ANTI-VIVISECTION

The anti-vivisectionist is ever active in endeavoring to put over his ill-advised views. This time he is circularizing the clergy of

the country. If all men of the ministerial profession treated anti-vivisectionsist propaganda as does Dr. Alvin E. Magary, formerly of Detroit but at present a resident of Brooklyn, the breed would soon be where they belong. Dr. Magary writes daily for the *Detroit Free Press* under the heading "I Rise to Remark." His "remarks" are always much to the point, but the following will appeal particularly to our members.

"There has come to my desk," writes Dr. Magary, "an impassioned pamphlet against vivisection. It calls on all ministers to aid in putting an end to this method of scientific investigation.

"I do not doubt that there are coarse-fibered men engaged in research who inflict horrible and needless torture on animals; but no discussion of the matter ought to be carried on without considering certain facts.

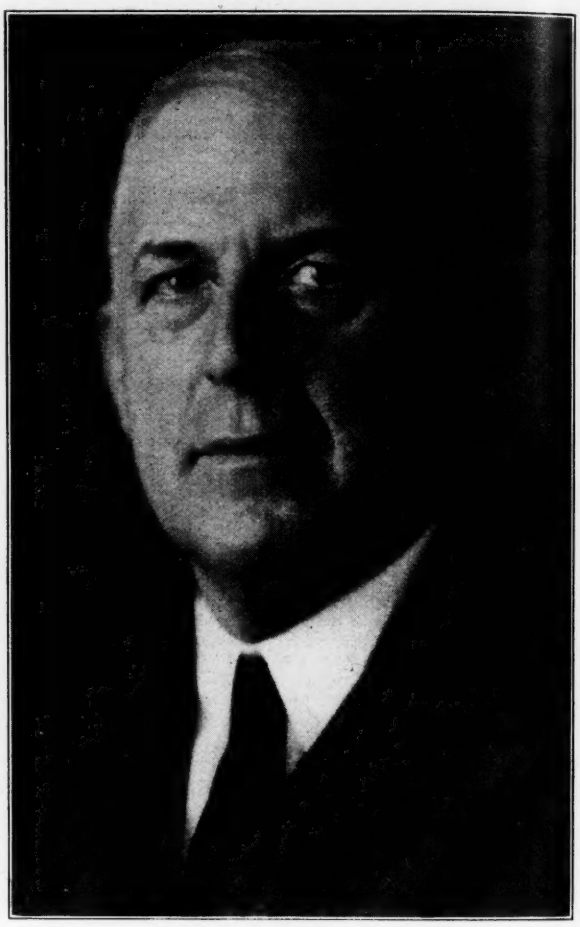
"Modern surgery prolongs thousands of lives and saves human beings from untold pain. It is based on discoveries which could not have been made without long-continued experiments on animals. Tissues can be transplanted, tumors in the skull removed, diphtheria, meningitis, typhoid, lockjaw prevented. A generation ago, diphtheria was the fear and horror of every doctor. It took children by hundreds, once it got started. A generation ago typhoid carried off 86 per cent of all the American soldiers who died in the Spanish-American war. Today these diseases are no longer in the class of plagues.

"It is a fine thing to defend the helpless. The man who does not love animals and befriend them is wanting in something fine and vital in his character. But facts are facts, and we do not help matters in this world by permitting our feelings and sympathies to run away with our brains.

"When someone you love lies on the operating table, and you realize that but for discoveries made through experiments on animals there could have been no anesthetics, you may think the pains suffered by dogs and cats and guinea pigs have not been in vain."

PRESIDENT DR. CARL F. MOLL

Dr. Carl F. Moll, made president-elect of the Michigan State Medical Society at the 110th Annual Meeting at Benton Harbor, now becomes president to succeed Dr. Ray C. Stone of Battle Creek, who has served as president the past year as the culmination of valuable services rendered the Society for a number of years. It was our pleasure to comment on the election by the House of Delegates of Dr. Moll (see page 932, Volume XXIX, this Journal). For the coming year the affairs of the Michigan State Medical Society will be piloted by a master hand. Dr. Moll is well fitted by temperament as well as experience for the position of President. We quote from the editorial in which we commented upon Dr. Moll's election: "One of Dr. Moll's friends writes: 'I have never heard from him an unkind word, or one in depreciation of a fellow practitioner; not that his attitude is negative, but because of a large charity for human failings and lapses. Concerning these, he is amused or silent, or he ignores them, but is never censorious.'" The friend mentioned was the late Dr. C. B. Burr.



DR. MOLL

The Journal joins in congratulations to the new president in what is a reciprocal honor—to Dr. Moll and to the Michigan State Medical Society.

TEN DOLLAR OBSTETRICS

The Public Welfare Commission passed a resolution recently to offer the doctors of Detroit who may be interested the sum of $10.00 each for confinements in indigent families. These cases had heretofore been cared for at the municipal hospitals at public expense and at a stated cost of $67.00 each, so that the care included hospitalization as well as the actual obstetric service. The offer is in the way of a temporary measure to aid in civic economy, which is so very

necessary in every department in the metropolitan city of the state. This has given rise to considerable discussion pro and contra among the members of the medical profession. Some maintain that it is impossible to attend confinements at this price and to do good work. This argument may be disposed of by the statement that a doctor or any other professional man is presumed to give of his best no matter whether his fee be $10.00 or ten times the amount. In other words the quality of a doctor's work should never depend upon the amount of money he receives. Such is true of but very few other occupations under the sun, but it is true of medicine. There is only one grade of service in medicine and surgery and that is the best that the trained physician and surgeon can render.

The fee is small. It might have been doubled and then have effected marked economy over such service as rendered by the municipality in a public hospital. Obstetrics is as a rule a poorly paid medical specialty when we consider its exacting nature, the responsibility assumed by the obstetrician and the demands upon his time. Often the skill required rivals or surpasses that required in many operations which are performed under ideal conditions in the domain of major surgery. The general practitioner to whom the majority of confinements fall may be said practically never to be paid in proportion to what his services are worth even should he receive all that he asks.

However, as we have said, this is an emergency measure and is not presumed to be any more than a tentative means of tiding over a distressing situation. While the state meets this small expense, we do not see that this is the entering wedge of state medicine. The fee is not sufficiently attractive to make it popular among the doctors during better times and it means now that the doctor who would be called upon to do this work will receive something rather than nothing at all.

It would seem to be almost entirely out of the field of the trained specialist in obstetrics who confines his attention entirely to this class of case. However, by those in large municipalities who are finding it a difficult matter to get started or to carry on during the lean months (I hope it will not be years) this $10.00 of sure money will doubtless be appreciated. As we understand, no concerted action has taken place in the Wayne County Medical Society, it being optional among the members whether they will accept this fee or not. We see less savoring of state medicine about it than were these cases to be cared for in a municipal hospital, which is state medicine or *civic* medicine, which is the same thing.

The members of the Welfare Commission, two of whom are prominent surgeons of the city, and members of the Wayne County Medical Society have endeavored to do something constructive towards helping out an unfortunate situation, and the proffered solution, while it may not be ideal, should not be lightly dismissed. We feel, however, that while the fee may be inadequate, it should not affect the quality of service. The doctor, all things considered, renders more gratuitous community service than any other person. What should be a community service in too many instances has been shelved upon the doctor to render gratuitously.

MEDICAL HISTORY OF MICHIGAN

It is less than a year since the second volume of the Medical History of Michigan appeared. This book has been reviewed by the Annals of Medical History, which is in a class by itself. The Annals of Medical History is probably the most high grade and ably edited periodical of its kind in the world. Anything therefore that the Annals would print in its reviews of books compels the attention of the most critical reader. It is with pleasure that we quote the following review of Volume II (Medical History of Michigan), which appeared in the July number of the Annals of Medical History.

"The first volume of this monumental record of the medical annals of Michigan was reviewed in the Annals of Medical History, 1:714, 1930. The second volume contains chapters on Controversies; Malpractice, Litigation and the Physician as a Witness, Medical Defense; A Medical Miscellany and Medley; Extra-Professional Activities; Women Physicians, which are rather a hodge-podge of more or less anecdotes. The chapter on the history of the Michigan State Medical Society and that on Some of the Active Medical Societies contain much valuable historical material. A notable section is that on the History of Hospitals and Nursing in Michigan, by Dr. Richard R. Smith.

Michigan has done much for its mentally deficient and diseased, and this subject is well handled by Drs. W. J. Kay and C. B. Burr. The concluding chapter deals with the military services rendered by the medical profession of Michigan in the va-

rious wars of the United States. There are a number of illustrations, chiefly of institutions. The Committee is to be congratulated on the completion of such a tremendous task in such a satisfactory manner. Its work has been most thoroughly done and these two volumes constitute a complete repository concerning the medical profession and medical institutions of the State. This volume contains a very complete index to the whole work."

ONE EFFECT OF THE STATE MEDICINE IDEA

A serious condition is confronting sick benefit or health insurance societies in Great Britain. The number of sick claims and the amounts spent upon them, in spite of the general improvement in public health and decline in death rate, are alarming in their upward trend. Sir Kingsley Wood, who was Parliamentary Secretary to the Ministry of Health in the last Government, said that there are several grave factors in the situation. Among them:

"The claims of married women have so seriously affected the funds of approved societies that they have been warned that, unless conditions improve to a marked extent, the whole of the present resources will be exhausted in a few years, in providing ordinary benefits. A number of societies who cater for married women have already been obliged to cancel their additional benefit claims altogether. The Government actually recently stated that the sickness benefit claims of the unmarried women have risen by no less than 60 per cent, and those of married women by 106 per cent. The disablement benefit claims of unmarried women have increased by 100 per cent, and those of married women by 159 per cent.

"In regard to men, it is the younger insured persons rather than the matured insured whose burden on the funds of approved societies has increased in recent years."

While the various benefit societies are not a part of the Government, so-called socialized medicine tends to paternalism, so that we have a disposition to milk anything that is free or easy, such as clinics or insurance benefits, for all they are worth.

ALFRED W. HORNBOGEN, M.D.

Hornbogen is dead. His life was taken by a gunman in prison and while Dr. Hornbogen was performing his duties in the prison hospital. He went as we feel he would like to go—on duty and while on service in discharging his professional duties.

Dr. Hornbogen was widely known to the profession of Michigan and had a large national acquaintance by reason of his many years of service in the House of Delegates of the American Medical Association. He was past president of his County Society, Upper Peninsular Medical Society and the State Medical Society. For a number of years he was physician or acting physician in the State prison at Marquette.

Dr. Hornbogen was a character reflecting a unique individuality. It was difficult at times to understand him. Yet as one penetrated his veneer there became apparent qualities of the highest. Basicly he was sincere and his ambitions were laudable. He made friends, he lost them and then regained them. That was his character and withal a character that was constructive in his community and the state. He did much, he gave much and materially aided in the solution of our problems and the furtherance of our policies.

"Horney," as he was familiarly known, is gone. We shall miss him. He served and in his peculiar way he achieved. His life was not in vain. We shall think of him as one who in his own way filled his niche in life and added to our common good a helpful, personal contribution.

F. C. W.

OTTO LEE RICKER, M.D.

Brief announcement of the death of Dr. Ricker was made in the last issue. For the purpose of permanent record this tribute is written for one who served and lived so well in our professional world.

Dr. Ricker graduated from the Detroit College of Medicine and Surgery in 1904. Following graduation he became associated with Dr. B. H. McMullen of Cadillac and continued in practice in that community till his death.

During these twenty-seven years he was faithful to all his responsibilities and conscientiously sought to serve his clientele to the best of his ability. Frequent visits to clinical centers and the pursuit of postgraduate work enabled him to remain abreast of scientific progress and to reflect it in his practice.

In organizational work he was ever to be found earnestly engaged. He served as secretary and president of his local society. He was a state delegate for many years. He served as Councilor from his district over a period of eight years. His professional life was characterized by an ever willingness and desire to uphold our traditions and to exemplify the traits that inspired confidence and respect.

Dr. Ricker was active in the communal

movements of Cadillac and lent his support to their advancement. He was a veteran of the World War and a working member in the local Legion post. A founder of the local Rotary Club, he maintained his membership obligations uninterrupted. In many ways Dr. Ricker affiliated himself with the contacts of life so that he created a place and attained a position that endeared him to his friends, his community and the profession of his state.

Dr. Ricker's death is a distinct loss which we fain would have postponed. He will be missed for we needed him yet awhile to better establish our ideals and principles. We shall revere his memory as one who exemplified the life of a true doctor of medicine.

F. C. W.

THE OLDEST BOOK IN THE WORLD

The oldest book in the world should have special appeal to the medical profession, inasmuch as it is a book on medicine. It is The Papyrus Ebers, written about 1550 B. C. Its contents, however, consist of bits of folklore, much of it having its origin from five to twenty centuries earlier than the date at which The Papyrus was written. Of this famous document Warren R. Dawson, in an interesting little book entitled, *Magician and Leech,* gives the history. It was found between the legs of a mummy in a tomb near Thebes, about 1862, when it was acquired by the Egyptologist Ebers, whose name it bears. It consists of a miscellaneous collection of extracts and jottings from at least forty different sources. Among them we have a large number of prescriptions for a number of specified diseases. There are sections dealing with diagnosis and symptoms and a passage of a physiological nature on the heart and its vessels. The concluding portion treats of wounds and abscesses and boils, so that The Papyrus may be looked upon as the first work on surgery.

The text of The Papyrus is a long scroll twelve inches wide and sixty-eight feet in length. It is written in red and in black ink and wonderfully preserved, in spite of its nearly 3,500 years of age. It is divided into pages of equal size of about twenty lines to a page. While the pages are numbered, they were not cut, so that the scroll was of the length stated. The document has since been cut into pages and mounted; it is in the Library at the University of Leipzig. Shortly after its discovery it was translated into German, but only recently has it been done into English.* Two facsimile copies were made, one of which is the property of the British Museum.

The volume before us gives not only copious extracts, but the translator estimates the influence of this work on medical history. The earlier parts of the Old Testament and the medical lore it contains, according to Professor A. S. Yahouda, was inspired by Egypt. The five books attributed to Moses show marked intimacy with the Egyptian influence. Moses himself was "the child of the Nile," and, according to this author, "the medical information in the Old Testament is essentially identical with that of The Ebers Papyrus."

As we have said, The Papyrus Ebers is devoted to medicine, with also an addendum that may be looked upon as the first treatise on surgery. The diseases included range from the sting of a wasp to the bite of a crocodile. The ancient Egyptians were evidently very particular about their personal appearance, for considerable space is given to cosmetics. There are recipes to kill scorpions and lizards, to charm away fleas, lice and mice, to soothe the crying baby. There are eight hundred and eleven prescriptions in the ancient document, which are dispensed in the form of salves, plasters, poultices, snuff, inhalations, gargles, draughts, confections, pills, fumigations, suppositories and enemata. They range from prescriptions of only one ingredient to those comprising as many as thirty-seven ingredients; many of them are apparently harmless, if without therapeutic effect. A significant thing is that the ancient Egyptians were the first to form an acquaintance with that god of drugs, castor oil. From the English translation we quote as follows:

> Memorandum on the use of the castor oil tree (as found in the ancient writings of the wise men).
>
> When a Person rubs its Stalk in Water and applies it to a Head which is Diseased, he will immediately become as if he had never been ill.
>
> When a Person who suffers from Constipation chews a little of its Berry along with Beer, then the Disease will be driven out of the Sick One's body.
>
> Also, a Woman's Hair will increase in growth by using the Berries. She crushes them, makes them

*The Papyrus Ebers, translated from the German version by Cyril P. Bryan, M.D., Demonstrator in Anatomy, University College, London, with an introduction by Prof. G. Elliott Smith. D. Appleton and Company, New York.

into one, puts them in Oil, and anoints her Head therewith.

Furthermore, the Oil from its Berries is pressed out as an Ointment for the use of any Person who has the uhe-abscess-with-stinking-matter. Lo, the Evil will fly as though he had suffered nothing! For Ten Days he anoints himself afresh daily in the morning in order to drive the abscess away.

Doubtless castor oil alone was one of the best single drugs in the service of ancient man, and particularly useful where restoration to health depended upon the functional process of elimination; but the Egyptians went farther. They drew their materia medica not only from the mineral and vegetable, but also from the animal world. Whenever they got hold of a substance which seemed to them to possess even the slightest therapeutic virtue they prescribed it internally and externally, raw and cooked, ripe and unripe, and often in an actually decayed condition.

Ryan selects some of the remedies, the therapeutic action of the most of which would be difficult to explain, in the light of our modern knowledge.

"Imagine (if you can)," he says, "a poultice consisting of the Zizyphus Lotus, Watermelon, Cat's dung, Sweet Beer, and Wine; or a mixture of Rotten Flesh, Herbs-of-the-Field, and Garlic, cooked in Goose-oil and swallowed for four days against Debility; or a Hair-restorer composed of Vulva, Phallus, and Black Lizard; or a Hair-dye concocted of the Womb-of-a-Cat warmed in Oil with the Egg-of-the-gabgu-bird; or another Hair-dye which combines a Tape-worm with the Hoof-of-an-Ass and the Vulva-of-a-Bitch; or a mixture of Opium and Fly-dirt-which-is-on-the-Wall, to soothe a crying child; or a Face-cream of Bullock's Bile and Ostrich Egg, beaten up with Fresh Milk; or a diuretic of Water-from-the-Bird-Pond, Swill-of-Beer, and Fresh Milk; or a purgative consisting of an Onion beaten up in Froth-of-Beer; or a draught composed of the one-thirty-second part of the Tail-of-a-Mouse with Honey, one-third, for cooling the anus; or another equally useful draught prepared by whipping up the Film-of-Dampness-which-is-found-on-the-wood-of-Ships in Froth-of-Beer, for Falling of the Womb; or a mixture of Scrapings-of-a-Statue and Mint-of-the-Mountains, cooked in Oil and Wax, to be taken for four days to 'protect against everything.'"

Kipling must have had something like this in mind when he wrote:

"Excellent herbs had our fathers of old—
Excellent herbs to ease their pain—
Alexanders and Marigold,
Eyebright, Orris, and Elecampane,
Basil, Rocket, Valerian, Rue,
(Almost singing themselves they run)
Vervain, Dittany, Call-me-to-you-
Cowslip, Melilot, Rose-of-the-Sun.
Anything green that grew out of the mould
Was an excellent herb to our fathers of old.
Wonderful little, when all is said,
Wonderful little our fathers knew.
Half their remedies cured you dead—
Most of their teaching was quite untrue.
Look at the stars when a patient is ill,
(Dirt had nothing to do with disease)
Bleed and blister as much as you will,
Blister and bleed him as oft as you please.
Whence enormous and manifold
Errors were made by our fathers of old."

Egyptian therapeutics, however, was not entirely irrational. They had learned the proper use of a number of drugs that are employed today. Constipation, considered a disease of the modern world induced by modern living conditions, appears to have been just as prevalent among the ancient Egyptians, for we have the following: "Remedy to clear out the body and to get rid of the excrement in the body of a person."

Berries of the castor oil tree
Chew and swallow down with Beer in order to clear out all that is in the body.

Numerous prescriptions are given which space will not permit. This is a sample:

Prepare thou well this purgative. Hereafter it is used against the constipated body.

Herbs-of-the-Field	1
Gengent-beans	1
Aneb-plant	1
Bread-dough	1

Pound, make into one, make four cakes thereof, and let him eat.

They evidently learned also how to treat diarrhea (the symptoms at least) for we find frequent use made of the poppy plant. Onions and figs were freely used in the treatment of constipation and not without reason. The therapeutic effect was due in the first to the roughage and the second to the mild irritant. Onions and dates figured in no small way as remedies for various forms of indigestion.

The section on minor surgery shows the ancient Egyptian very conservative in the use of the scalpel.

Among the other subjects dealt with are the urinary system, diseases of women, of the skin, eyes, ear, nose and mouth, the nervous system, the heart and circulatory system, the hair, the AAA disease, which the translators interpreted as Bilharzia. The remedies and methods of treatment in all these diseases are equally bizarre.

With the early Egyptians there was no conflict between the rational and the magical. Things which to us are magic were purely rational in the minds of primitive

people. In these early times (to which the Ebers Papyrus refers) there was no distinction between science and religion, or between reason and magic. According to Dr. G. Elliott Smith, when the validity of the general principle was no longer tenable, practices which had a stronghold on the imagination persisted. He tells of how he found the remains of mice in the stomachs of small children buried in a predynastic cemetery in Upper Egypt. The mice had been skinned and fed to the children as a remedy just before death, nearly sixty centuries ago. It was believed that the mouse was a life giving substance because they were seen to emerge from the cracks in the sun baked mud after the receding of the overflow of the Nile. To the ancient Egyptians they represented the life-giving virtues of the river. Hence these mice were regarded as one of the most effective elixirs of life, and therefore the proper remedies in emergencies. Professor Smith goes on to relate that in England today this practice prevails among thousands of people who have no notion of the origin of the custom of giving mice to sick children as remedies *in extremis*. The giving of a mouse would be considered a magical procedure, though it appeared to the ancients a perfectly rational act. What we call magic is simply the persistence of fallacies which were at one time rational applications of a general belief. Many of the absurd methods of treatment found in The Papyrus Ebers may be so explained. They represent the attempts of these early people to understand disease and to discover rational means of treating it.*

INFANTILE PARALYSIS

Bulletins are being issued from week to week describing the situation of the infantile paralysis epidemics. We will not presume to duplicate the information furnished our readers by these weekly bulletins. Attention is called, however, to the contribution by the Department of Health of Michigan which appears in this number of the JOURNAL, which outlines in detail the work of the commission appointed to study the situation.

*Introduction to Papyrus Ebers (Ryan) by Professor G. Elliott Smith.

A TRIUMPH OF CHEMISTRY

"In view of the marvellous things that are being done now," ponders a noted chemical engineer, "one begins to wonder just how long it will be before a man takes a tablet out of his pocket, swallows it, and has his meal for the day." This bit of reverie has prompted the poet of the Manchester Guardian to court his muse with the following result:

I had some pills in a box to-day—
And I've just remembered the painful fact
That these tablets neat that I stowed away
Were somewhat unwisely stored and packed;
For some were pills for my stomach's sake
(The doctor sent them to cure the bile),
And some were meals that I meant to make
In the chemical, compact, modern style.

You take a pill with a timely gulp—
And a five-course dinner goes down complete;
It's all reduced to a chemical pulp
And all correct from the soup to sweet.
But you see how awkwardly I am fixed,
The situation is far too rich—
For I got my meals and my medicine mixed
And I haven't a notion of which is which.

I swallowed something an hour ago
To fill a void that began to ache,
But to judge by feelings from down below
I fancy I've made a profound mistake.
Now a-lack-a-day and woe is me!
I'm really feeling distinctly ill—
And I don't know whether I've had my tea
Or taken an indigestion pill!

NORTHERN TRI-STATE MEDICAL SOCIETY

The Northern Tri-State Medical Society, which includes Michigan, Ohio and Indiana, is one of America's oldest medical organizations, also one of the most democratic, in this or any country.

The Northern Tri-State Medical Society was born and organized in 1873, and for a number of years its meetings were held semi-annually. About twelve years ago that custom was discontinued; since then the meetings are held only once a year—in April.

The Northern Tri-State is an outgrowth of a still older organization, the Southern-Michigan Medical Society, which for a number of years (prior to 1873) held its regular meetings in borderline towns and villages of Southern Michigan. These meetings were such in character as to attract physicians from Northern Ohio and Indiana, who became regular attendants. The meetings were always held on the first Tuesday of the month following the full moon. This custom is still being followed.

The reason for originally holding meetings under this particular arrangement was that in those early years modes of travel were slow and roads often difficult for driving, so by holding the meetings upon the first Tuesday following the full moon it was not only easy to remember the date, but since the meetings were for the one day only and lasted until late that night, those who attended could return home on horseback, aided by moonlight.

The meeting will be held at Toledo, Ohio, on the first Tuesday following the full moon of April, 1932, with Dr. Carl Dudley Camp, of Ann Arbor, Michigan, president for the year. A bumper attendance and splendid program is anticipated, though it is not expected that many will travel to and from on horseback, though some of us may have to walk.

NOTE: The editor is indebted to Dr. George Van Amber Brown of Highland Park for this interesting bit of history.

DUODENAL ULCER AMONG PHYSICIANS: TREATMENT IN 100 CASES*

H. R. Hartman, M.D., Division of Medicine: Without accusing our profession of over-enthusiasm for any kind of treatment, the question to be considered is how would physicians who are afflicted with duodenal ulcer react to the usual advice given to the laymen? One hundred physicians who have been suffering with ulcer for at least one year were studied. Results in this group have been compared with results Balfour obtained by operating on 100 physicians, and with the results obtained by medical treatment for ulcer of ninety-five lay patients. The average age in Balfour's group was forty-seven years, with an average duration of symptoms of thirteen years. In 40 per cent of the cases hemorrhage had occurred, and in 32 per cent, obstruction. Satisfactory results were reported in 90 per cent after one operation. Of the 100 physicians who selected their own treatment, the average age was forty-six and two-tenths years, and the mean duration of symptoms, nine and one-tenth years. Among ten of these who came to operation the average duration of symptoms was identical to that in Balfour's group; namely, thirteen and one-tenth years. Among those who were not treated surgically, the average duration of symptoms was eight and seven-tenths years. Chronicity appeared to be a deciding factor for operation. Three of the ten patients who submitted to operation had hemorrhage or suspected perforation, and among the ninety who did not submit to operation hemorrhage occurred in nine cases, and suspected perforation in seven. These complications were lacking among medically treated laymen.

Of the physicians who were given various forms of medical treatment seventy-three (81 per cent) were satisfactorily relieved. Balfour obtained relief in 90 per cent. Of the ninety-five lay patients who underwent medical treatment in a hospital, seventy-one (74 per cent) were reported as improved. These results are similar. Although chronicity apparently plays a larger part in choice of treatment than do the usual complications of ulcer, study of all the evidence leads one to conclude that conservatism dominates among physicians in selecting treatment. Nevertheless, if other means of relief fail, operation, with its good results, probably will be sought.—*From proceedings of the Staff Meetings of the Mayo Clinic.*

"The possibility that a man may be able to ripen his own time—which I hasten to add is not a fancy of my own—is worthy of thought. One traces the conception of contagium vivum to early times; and the soporific sponge used at the School of Salerno was an ancient tradition. No idea is wholly new; what is new is getting people to adopt it and to act upon it. We know from his Notebooks that Leonardo fairly bristled with novel ideas, but, whether from indifference or inability, failed to register them on his contemporaries. He was probably a more observant and skillful dissector than the youthful Vesalius, who, however, had the vigour and determination, when the world was content with Galen, to enforce upon his contemporaries the ripening of modern anatomy. And so did Harvey for modern physiology, though instead of a huge folio it was a small, badly printed tractate of seventy-two pages full of typographical errors which turned the trick—and incidentally ruined his practice."—DR. HARVEY CUSHING, *The New England Journal of Medicine.* June 11, 1931.

*Abstract of paper presented before the meeting of the Panamerican Medical Association, Mexico City, Mexico, July 26-31, 1931.

DEATHS

DR. MICHAEL C. CRONIN

Dr. Michael C. Cronin of Mt. Clemens died suddenly at Grace Hospital, on August 12, at the age of seventy-four. He had been ill for four weeks before his death. The cause of death was heart disease. Dr. Cronin came to Mt. Clemens from Bangor, Michigan, thirty-two years ago. He had never fully recovered from injuries received in a train wreck in Kentucky four years ago. Dr. Cronin was a 32nd degree Mason and a member of the Mt. Clemens Lodge of Masons. He is survived by his widow and two daughters.

GENERAL NEWS AND ANNOUNCEMENTS

The American Medical Association will meet in New Orleans the week of May 9, 1932.

Dr. D. S. Brachman, Detroit, returned the middle of September from a several weeks' visit to European clinics.

Dr. F. C. Warnshuis, Grand Rapids, was elected vice-president of the Aero-Medical Association at the annual meeting held in Kansas City September 6 to 8. The next annual meeting will be held in Cleveland.

ANNUAL MEETING NOTES

J. Milton Robb, Detroit, President-elect.
H. J. Pyle, Grand Rapids, Re-elected Speaker.
Retiring Councilors re-elected.
Kalamazoo place of next meeting.
House of Delegates will hold a special meeting before February 1 in Jackson.
Complete minutes in next issue.

DETROIT MEDICINE IN THE 80'S AND 90'S

"Recollections of Detroit Medical Life in the 80's and 90's" is the title of a very interesting story by Dr. Hugo Erichsen of Birmingham, Michigan, which appeared in the Summer (1931) number of the Michigan History Magazine, a quarterly published by the Michigan Historical Commission, Lansing. The paper gives interesting reminiscences of a number of the leading physicians and surgeons of the time, most of whom are known only to those practicing today who have passed the half century mark. The article contains an illustration of the Detroit Medical College of that time, as well as pictures of Drs. E. A. Chapoton, Eugene Smith, Theodore A. McGraw, E. L. Shurly, F. A. Spalding, A. E. Currier, H. O. Walker, J. H. Carstens, N. W. Webber, America's oldest medical organizations, also one of the and a silhouette of Dr. Erichsen himself.

DR. G. VAN AMBER BROWN LOCATES AT EDINBURG, TEXAS

"The decision of Dr. George Van Amber Brown to make Edinburg, Texas, his future home (after September 1) means the loss to the Wayne County

Medical Society of one of its most active and influential members.

"In his thirty-odd years of practice Dr. Brown has always evinced a keen interest in scientific medicine and has in addition contributed much time and effort for the benefit of organized medicine. Always a champion of the young man, he organized the Noon Day Study Club in the fall of 1927, and has had the pleasure of watching it grow in size and importance to become one of the most prominent activities of The Society. His service as president during 1927-28 was characterized by constant and unstinting effort in behalf of the membership, for which he was rewarded by being elected a trustee. In this capacity he has continued to render meritorious service for the past three years.

"His affiliation with the Highland Park Physicians' Club and the prominence and power which he brought to that organization when, as its president, he initiated what is now a highly popular one-day annual clinic, will long be remembered.

"Dr. Brown has the thanks and appreciation of all the members for his many efforts in their behalf, and while his decision to leave Wayne County is deeply regretted, he has their sincere wishes for success and good fortune in his new home in Texas." —Wayne County Medical Bulletin.

CHILD HEALTH COMMITTEE

Governor Brucker on September 10 named the members of the medical profession and others who are to constitute a child welfare advisory council whose duty it should be to correlate State agencies in accordance with recommendations of the National White House Conference which was assembled by the President in Washington in 1930. The state advisory council will hold a meeting in Lansing on November 10. The following are the members of the medical profession of the State who are members of this committee:

Dr. Ray C. Stone, Battle Creek; Dr. R. E. Patterson, Detroit; Alexander G. Ruthven, president University of Michigan; Dr. Frederick G. Novy, Ann Arbor; Dr. J. D. Bruce, Ann Arbor; Dr. John Sundwall, Ann Arbor; Robert S. Shaw, president Michigan State College; Dr. R. M. Olin, East Lansing; Dr. W. H. MacCraken, Detroit; Dr. Henry F. Vaughan, Detroit; T. J. Werle, Lansing; Miss Amy Beers, Muskegon; William J. Norton, Detroit; Dr. B. W. Carey, Detroit; Dr. Stuart Pritchard, Battle Creek; Dr. R. B. Harkness, Houghton; Chalmers J. Lyons, Ann Arbor; Dr. Louis J. Hirschman, Detroit; Dr. George J. Curry, Flint; Dr. Karl D. Brucker, Lansing; Dr. Richard R. Smith, Grand Rapids; Dr. J. D. Brook, Grand Rapids; Dr. C. A. Neafie, Pontiac; Dr. W. F. English, Saginaw; Dr. J. H. Powers, Saginaw; Dr. Frank P. Bohn, Newberry; Dr. J. G. R. Manwaring, Flint; Dr. A. M. Campbell, Grand Rapids; Dr. C. G. Jennings, Detroit; Dr. Thomas B. Cooley, Detroit; Dr. Angus McLean, Detroit; Dr. B. R. Shurly, Detroit; Dr. H. M. Joy, Calumet; Dr. John Harvey Kellogg, Battle Creek; Dr. R. L. Dixon, Lapeer; Dr. J. T. Upjohn, Kalamazoo; H. Haskell, Northville.

MULTIPLE MYELOMA AND DIABETES INSIPIDUS

Mark J. Bach, Milwaukee, and William S. Middleton, Madison, Wis., report an instance of the coincidence of gross pathologic changes in the bones and diabetes insipidus. Of particular significance were the possible changes in bony structures about the sella. Whatever the interrelationship between the bony lesions and the disturbance in water metabolism, a further example is added in the case of multiple myeloma with associated diabetes insipidus. —*Journal A. M. A.*

COMMUNICATIONS

City of Detroit
Department of Public Welfare
August 28, 1931

Dr. F. C. Warnshuis, Secretary
Michigan State Medical Society
1508 G. R. National Bank Bldg.
Grand Rapids, Michigan

Dear Dr. Warnshuis:

I think this bulletin is extremely valuable, so much so that I sent one copy immediately to our Admitting Room to be read by all of the doctors on duty there, and the additional copies were requested in order that I might have one for each of our forty-two residents and interns and for the nursing supervisors. This bulletin is particularly valuable in the case of poliomyelitis on account of the fact that the early symptoms are so frequently overlooked or misinterpreted and I think this activity on the part of the State Society is very much worth while and could be extended to a considerable extent.

Your very truly,

E. T. OLSEN, M.D.,
Superintendent.

Michigan
Crippled Children Commission
Lansing, Michigan
August 19, 1931

Dr. F. C. Warnshuis
Secretary, State Medical Society
Grand Rapids, Michigan

Dear Dr. Warnshuis:

I have been requested by Dr. F. C. Kidner, Chairman of the Michigan Orthopedic Association, to send to you the following resolution passed by that Association and presented to the Michigan Crippled Children Commission for action on July 24, 1931:

"It has come to the attention of the Michigan Orthopedic Association that cases of recent simple fractures have been cared for by members of the Association under the Crippled Children Act.

"At a meeting of the Association held on Friday, July 17, this matter was discussed, and while the care of recent fractures forms a large proportion of the cases handled by orthopedic surgeons in private practice, it was felt that these cases would hardly fall under the heading of 'Crippled Child.' It was decided, therefore, to recommend to the Michigan Crippled Children Commission that our Association felt that the care of recent uncomplicated fractures would not fall under the heading of 'Crippled Child' and consequently would not be cases to be cared for by the members of the Michigan Orthopedic Association under the Crippled Children Act."

The Commission had under consideration at its meeting on July 29 several other matters of policy and procedure and they were all covered by a motion duly presented and carried that *Rules and Regulations for the Conduct of the Business of the Commission* as required by Section 11 of Act 236 of 1927 be prepared and adopted by the Commission.

I might say further that these rules and regulations are now being prepared and will undoubtedly be considered and possibly approved at a meeting to be held in Battle Creek, probably on September 18.

Sincerely yours,

HARRY H. HOWETT,
Secretary-Treasurer.

Marquette, Michigan
August 26, 1931

F. C. Warnshuis, M.D.
Secretary, State Medical Society
Grand Rapids, Michigan

My dear Fred:

At the recent meeting of the Upper Peninsula Medical Society a resolution was passed to have a gavel made and presented to the speaker of the House of Delegates of the A. M. A., at the next session.

Dr. A. W. Hornbogen was elected to present the gavel at the next meeting to be held at New Orleans.

Owing to the fact that I consider that the U. P. gavel and the one used by the speaker of the House of the State Medical Society is too small, I therefore made arrangements to have a larger one made from one piece of copper. Owing to the fact that it would be too heavy, and instead of breaking the gavel as has been done in past years, you would undoubtedly break the table, I am having the head of the hammer hollowed out in order to make it lighter.

I am anxiously awaiting the September number of the Journal in order to see what the program is for the coming meeting at Pontiac.

With kind personal regards I remain,

Your friend,

A. W. HORNBOGEN.

Ogdensburg, New York
August 31, 1931

Frederick C. Warnshuis, M.D.
Grand Rapids, Michigan

My dear Doctor:

I am shocked and grieved to hear of the tragic death of Doctor Hornbogen.

The doctor was such a sturdy, aggressive type, that his personality always appealed to me. He had, as all humans do, imperfections, but he always interested me, and "Hornbogen of Michigan" will be missed in the House of Delegates. His is the third death in the members of the House of Delegates in attendance at the Philadelphia meeting.

Thanking you for writing me, I am

Very sincerely yours,

GRANT C. MADILL.

Detroit, Michigan
August 31, 1931

Dr. F. C. Warnshuis, Secretary
Michigan State Medical Society
Grand Rapids, Michigan

Dear Fred:

A week ago I received a request from Mr. Harry H. Howett of the State Commission for Crippled Children, asking that we assign Dr. J. T. Hodgen to the Muskegon clinic on October 14. I immediately wrote to Mr. Howett assigning Dr. Hodgen, explaining that all the orthopedic surgeons agree that it is foolish to send anybody but Dr. Hodgen to clinics in the immediate neighborhood of Grand Rapids.

Your request made to me some time ago for a statement of faith by the orthopedic surgeons, as regards fractures, was immediately acted upon. A meeting was held in my office, at which were present the orthopedic surgeons including Dr. Hodgen, and we unanimously agreed that acute fractures should not be cared for by the orthopedic surgeons under the State Commission for Crippled Children. At the same meeting was present Mr. H. E. Van de Walker, Chairman of the State Commission, and he suggested that we send our conclusions in regard to acute fractures, in the form of a statement, to the State Commission.

This statement said, in effect, that we did not feel that acute fractures came under the Crippled Children Act, but that this in no way prejudiced our right to care for acute fractures in our private practices. Mr. Van de Walker stated that he would bring this matter before the full Commission and would send you an official notice on the attitude of the Commission which would be guided by the orthopedic surgeons' action.

Therefore, I believe that in a reasonable time, you will have an official statement from the Commission which will clear up the difficulty.

Sincerely yours,

F. C. KIDNER.

EULOGY TO DR. RICKER

DR. HUME ADDRESSES ANN ARBOR RAILWAY SURGEONS

To Company Surgeons: It is with a feeling of deep sorrow that we announce the passing away at Butterworth Hospital, Grand Rapids, on Thursday last, of Dr. Otto L. Ricker, who, since 1906, has been our company surgeon at Cadillac.

The Doctor had not been in good health for several months, though in his always faithful and uncomplaining way, he had carried on his extensive professional duties almost up to the time of his entering the hospital, about two weeks prior to the time of his death.

On August fifth he underwent a most serious operation, which, though most skillfully performed, revealed the hopelessness of final recovery; there being found advanced cirrhosis of liver and spleen and other serious complications.

The funeral services were held in Cadillac last Saturday. The large Church auditorium filled with friends who knew him best and loved him most—many of them from miles away; the rendering of a few of the old fashioned songs that the Doctor loved best; the frank but eloquent statement by his pastor of what the Doctor had been to, and had accomplished in, the community life of Cadillac; the solemn quietness of the city and of the multitude of people on the streets, who stood at attention as the funeral cortege, escorted by the American Legion, the Boy Scouts and others, slowly wended its way to the final resting place, and then, after the commitment, and with hundreds standing at attention and in silence, the military salute and "taps"—all these things told of what Dr. Ricker's public, professional, and private life had meant to the community in which he had so long lived and served.

Respectfully yours,

DR. ARTHUR M. HUME, *Chief Surgeon.*

Owosso, Michigan, August 17, 1931.

APPROVES OF OUR EFFORTS

Editor, Journal Michigan State Medical Society:

I have had many opportunities during the last year and a half to review the contents of representative State Medical Journals. I have tried to do this critically but fairly in comparison with our own State Journal. It has been easily discernible by those who have read our State Journal the high character of its editorial pages. One cannot come to any other conclusion than that the MICHIGAN STATE JOURNAL stands well to the front in the ranks of its kind and as far as its editorial pages are concerned, there is none better. While I speak in an unofficial capacity, I am sure that our membership in Wayne County joins with that of the State at large with pride in your achievement. Personally I offer you my sincere congratulations.

H. WELLINGTON YATES,
President-Elect, Wayne County Medical Society.

Detroit
August 20, 1931.

SOCIETY ACTIVITY

NEWS ITEMS

The minutes and list of new officers will appear in the November Journal. This issue went to press before our annual meeting convened.

The Board of Registration will hold its annual meeting and examinations in Lansing on October 13, 14 and 15.

A letter received by Dr. J. D. Brook, Michigan delegate to the American Medical Association, from the Washington State Medical Association, gives the information that the latter organization has adopted in full the resolution pertaining to fees for insurance reports, presented by the Michigan State Medical Society to the House of Delegates of the American Medical Association at Philadelphia in May. Gradually, we are adding to our list other states who are favorable to the action taken by Michigan. It is expected that a preliminary report will soon be forthcoming from the Bureau of Medical Economics of the American Medical Association to which the question was referred.

POLIOMYELITIS ACTIVITY

On August 20, telephone information came from Lansing expressing apprehension that a poliomyelitis epidemic was threatening. It was intimated that the State Society might render effective assistance by warning the doctors to be alert and endeavor to make an early diagnosis in suspected cases.

This coöperation and assistance to the state department of health was immediately accorded in the following manner:

Within twenty-four hours a Poliomyelitis Bulletin containing a table of diagnostic symptoms and a request that members be alert when called to suspicious cases was mailed to 3,800 doctors.

Representatives of the Society met with the Commissioner of Health for the purpose of instituting preventive plans, consultant services and laboratory assistance and the formation of a state commission.

On August 24 it was deemed desirable to hold an Educational Clinic and such a clinic was arranged for on the twenty-seventh. Again within twenty-four hours 3,800 cards were sent to our members notifying them of this Clinic and the program that would be carried out.

From the letters received and the response made by our members we feel that this mobilization of doctors throughout the state created a corps of men who were on the alert to abort what promised to be an epidemic of considerable magnitude. It also revealed the Society's willingness to respond to and coöperate with health officials. This response re-affirms the statement frequently made that the greatest success of any health movement or activity is dependent upon the coöperation of the practicing physician—the bedside doctor.

The following letter is characteristic of the letters received:

Detroit, Michigan
August 26, 1931

Dr. F. C. Warnshuis
148 Monroe Avenue
Grand Rapids, Michigan

Dear Dr. Warnshuis

I wish to express to you, and the other members of the Council, my personal appreciation for the timely letter of warning regarding the present epidemic of poliomyelitis, which came to my desk the other day.

After thoroughly reading the same I placed it in my pocket to take home and save in the event of a future illness in the family. On my arrival at home I found that my oldest daughter became ill about noon and presented almost a typical picture as suggested by the list of symptoms. While I might have recognized the symptoms, the emphasis placed upon it by the pamphlet received certainly brought it more forcibly to my attention and probably saved many hours in obtaining the necessary medical attention, which Dr. Gordon is now instituting.

With best wishes, I remain,

Sincerely yours,

Claire L. Straith.

COUNCILOR McMULLEN

On August 28, President Stone, upon the unanimous nomination of the county societies constituting the Ninth Councilor District, appointed Dr. Harlan McMullen of Manistee as Councilor of that district to serve the unexpired term of Dr. Ricker, deceased. The district and state society are to be congratulated in securing Dr. McMullen to so serve as he is endowed with many professional and personal qualifications that admirably fit him for the office.

Dr. McMullen was born in 1880. He graduated from the University of Michigan Medical department in 1906 and has en-

gaged in practice in Manistee since that date. He has remained abreast of the times by attendance at state and national medical meetings, clinics and postgraduate work. He

DR. HARLAN MCMULLEN

plays a reasonable game of golf, rides horseback almost daily and evidences keen interest in the communal life of his home city.

LAW GOVERNING ABORTIONS

On September 17, 1931, a change in the Michigan Criminal Code which refers to abortion became effective. The present law reads:

16740.—"Death of child or mother from unlawful attempt to destroy child, act deemed manslaughter. Sec. 33. Every person who shall administer to any woman pregnant with a quick child, any medicine, drug or substance whatever, or shall use or employ any instrument or other means, with intent thereby to destroy such child, unless the same shall have been necessary to preserve the life of such mother, or shall have been advised by two (2) physicians to be necessary for such purpose, shall, in case the death of such child or of such mother be thereby produced, be deemed guilty of manslaughter."

16741.—"Attempt to procure miscarriage; penalty. Sec. 34. Every person who shall wilfully administer to any pregnant woman any medicine, drug, substance or thing whatever, or shall employ any instrument or other means whatever, with intent to procure the miscarriage of any such woman, unless the same shall have been necessary to preserve the life of such woman, or shall have been advised by two (2) physicians to be necessary for that purpose, shall, upon conviction, be punished by imprisonment in a county jail not more than one (1) year, or by a fine not exceeding five hundred (500) dollars, or by both such fine and imprisonment."

16742.—"Attempt to destroy unborn child or procure miscarriage; sufficiency of proof. Sec. 35. In case of prosecution under sections thirty-three (33) and thirty-four (34) of this chapter, it shall not be necessary for the prosecution to prove that no such necessity existed, or that the advice of two (2) physicians was not given."

16885.—"Medicine or drug to procure abortion; advertisement or sale prohibited. Sec. 1. The People of the State of Michigan enact, that no person shall in any manner, except as hereinafter provided, advertise, publish, sell, or publicly exposed for sale any pills, powders, drugs, or combination of drugs, designed expressly for the use of females for the purpose of procuring an abortion."

16886.—"Same; lawful sale; prescription record. Sec. 2. Any drug or medicine known to be designed and expressly prepared for producing an abortion, shall only be sold upon the written prescription of an established practicing physician of the city, village, or township in which the sale is made; and the druggist or dealer selling the same shall, in a book provided for that purpose, register the name of the purchaser, the date of the sale, the kind and quantity of the medicine sold, and the name and residence of the physician prescribing the same."

16887. "Penalty. Sec. 3. Any person violating any of the provisions of this act shall, upon conviction thereof, be punished by a fine of not less than twenty-five (25) nor more than one hundred (100) dollars in the discretion of the court."

The new statute which repeals the present law will read:

Section 14. "Administering drugs, etc., with intent to procure miscarriage: Any person who shall wilfully administer to any pregnant woman any medicine, drug, substance or thing whatever, or shall employ any instrument or other means whatever, with intent thereby to procure the miscarriage of any such woman, unless the same shall have been necessary to preserve the life of such woman, shall be guilty of a felony, and in case the death of such pregnant woman be thereby produced, the offense shall be deemed manslaughter."

(Felony is punishable by four (4) years in state's prison, as a maximum; manslaughter is fifteen (15) years.)

"In any prosecution under this section, it shall not be necessary for the prosecution to prove that no such necessity existed."

Section 15. "Selling drugs, etc., to produce abortion: Any person who shall in any manner, except as hereinafter provided, advertise, publish, sell or publicly expose for sale any pills, powder, drugs or combination of drugs, designed expressly for the use of

females for the purpose of procuring abortion shall be guilty of a misdemeanor."

(Misdemeanor is punishable by imprisonment in a county jail for ninety (90) days or one hundred (100) dollars fine, as a maximum.)

"Any drug or medicine known to be designed and expressly prepared for producing abortion, shall only be sold upon the written prescription of an established practicing physician of the city, village, or township in which the sale is made; and the druggist or dealer selling the same shall, in a book provided for that purpose, register the name of the purchaser, the date of the sale, the kind and quantity of the medicine sold, and the name and residence of the physician prescribing the same."

The new statute covers abortion upon the pregnant woman in any stage, instead of "woman pregnant with quick child," as stated in the present law. This modification will sustain a charge of manslaughter if the woman dies from abortive treatments. The penalty has also been changed, making certain abortions a misdemeanor, such as the selling, advertising and providing of things, etc., for the use of a woman in procuring an abortion.

H. S. C.

COUNTY SOCIETIES

GRAND TRAVERSE-LEELANAU COUNTY

The Grand Traverse-Leelanau County Medical Society met at the Traverse City Golf and Country Club on June 30, 1931.

The meeting was in the nature of a testimonial dinner for Dr. G. F. Inch, who is being transferred to take charge of the new State Hospital at Saline.

The following members sat down to a wonderful steak dinner: Drs. Kernkamp, Swanton, Rinear, F. Holdsworth, Hastings, Inch, Kyselka, Flood, Gauntlett, Swartz, Smiseth, Thompson, Holliday, Brownson, Murphy, Sheets, Sladek, and Thirlby.

Dr. Fred R. Thacker of Frankfort was elected to membership.

For representation during the annual meeting of the Michigan State Medical Society, the following members were elected: Delegate, Dr. E. F. Sladek; alternate, Dr. S. E. Smiseth.

Dr. Rinear invited the society to hold its summer picnic meeting at his cottage on Spider Lake. This was accepted.

Dr. L. Swanton made a very fine and appropriate speech in presenting Dr. Inch with a silver coffee service. In Dr. Inch's response, he said that he has enjoyed his stay with us and greatly regretted leaving.

The meeting adjourned at a late hour.

E. F. SLADEK, *Secretary.*

HILLSDALE COUNTY

The regular meeting of the Hillsdale County Medical Society was held at the Country Club, Hillsdale, Michigan, Tuesday, August 4, 1931. In the absence of both the President and Vice President, Dr. Poppen was chosen President pro tem, and called the meeting to order.

The minutes of the last meeting were read and approved.

The tribute to Dr. Sawyer which appeared in the JOURNAL OF THE MICHIGAN STATE MEDICAL SOCIETY was read and it was moved by Dr. Green and supported by Dr. Miller that it be spread upon the minutes of the society. Carried. Dr. Wade of Coldwater speaking for the Branch County Society cordially indorsed the tribute.

Dr. Poppen then introduced Dr. S. B. Frankhauser of Hillsdale, who had just returned from attending the International Rotary Convention at Vienna, to which he was the delegate for the Coldwater and Hillsdale Rotary Clubs.

Dr. Frankhauser gave a most interesting account of his experiences on the trip and said that he had the good company of eight doctors and fifteen ministers. Dr. Frankhauser said that he saw no evidence of poverty in the part of Europe he visited except in France, and met only one beggar.

The doctor stressed the point that doctors of the United States desiring to carry on postgraduate work have no need to go abroad, but would better put their time and money in their own country, because it is difficult to get admission to the lectures over there, impossible to get a transcript of them and even if admission is secured the translations are far from satisfactory. So he urged the doctors of this country to do their postgraduate work in our own Medical Centers, where they can get just as good or better teaching, with the enormous advantage of having it in their own language.

Not only so, but he said that the consensus of opinion among the doctors attending the convention was that the standings of the Medical Centers of Berlin and Vienna are not up to their former standard; that this is admitted by the physicians there, who give lack of funds as the reason. Dr. Frankhauser, however, found much to commend in the extreme care, in general use, to secure antisepsis and asepsis, each surgical patient being passed through two preparatory rooms instead of only one.

He met Dr. Krummer, who is the leading man in the X-ray field at Geneva and who made him most welcome at his Clinic.

The health authorities at Vienna have great power, having authority to take children to the hospital if necessary without the consent of their parents.

Dr. Frankhauser was much impressed by the lecture of Prof. Steven Telliner, who is the leading European medico-legal expert, on the subject of resuscitation in cases of suspended animation from electrocution or drowning. Dr. Telliner severely criticized the methods of Schaffer and Sylvester (pressure of the chest) and said that the only correct mode is alternate elevation of the arms to the line of the body and then depressing them to the chest rythmically about once per second, but without pressure. He exhibited a manikin which carried out this procedure on the table. So much in earnest is Dr. Telliner that he said if only in the United States of America some wealthy man would endow a chair of Electrotherapeutics, and this mode of resuscitation be adopted in cases of suspended animation, it would result in a great saving of life.

Discussion was led by Dr. Poppen followed by Dr. Martindale of Hillsdale and a full general discussion followed.

Dr. Wade of Coldwater said he has never known of a case of suspended animation being restored by

the pulmotor or by artificial respiration nor could any of the doctors present say that they had saved a life by artificial respiration. The Red Cross Demonstrator was quoted as saying that twenty minutes in the water was the limit if life is to be restored.

Following the discussion the name of Dr. Frayzer Matteson of Hillsdale was proposed for membership and he was unanimously elected.

This is conceded to be one of the best meetings that the society has had for a long time. Nineteen were present and aside from Dr. Frankhauser's instructive experience the extended discussion was most valuable.

The meeting then adjourned.

D. W. FENTON, *Secretary.*

MECOSTA COUNTY

The regular meeting of the Mecosta County Medical Society was held at Crystal Lake, Bitely, Michigan, Tuesday evening, August 11, 1931.

Those present were: Drs. MacIntyre, Grieve, Dodge, Chess, Yeo, Campbell, Soper and Burkart. Dentists Shank, Miller. Speaker and guest, Dr. R. W. Waggoner of the University of Michigan.

Dinner was served at 7:15 P. M. in the dinning room of the Bitely Outdoor Club.

Dr. G. H. Yeo, chairman of the Program Committee, introduced Dr. R. W. Waggoner of the University of Michigan, who gave a very instructive talk on "Non-organic Diseases of the Nervous System, Diagnosis and Treatment." Discussion was led by Drs. Yeo, Campbell and Soper.

On motion of Dr. James Campbell, supported by Dr. Yeo, a rising vote of thanks was tendered our host, Dr. Chess, and our guest, Dr. Waggoner, for the excellent entertainment given.

On motion the meeting adjourned.

JNO. L. BURKART, *Secretary.*

NINTH COUNCILOR DISTRICT

Our local secretary, Dr. J. F. Carrow, sent out a call to the Societies of the Ninth Councilor District for a meeting here, for a 6:30 dinner at Hotel Northwood, Tuesday, August 25. There was so much in the air on poliomyelitis that I took it upon myself to confer with our local boys about enlarging the call and having a poliomyelitis discussion. This turned out to be a wonderful meeting.

Dr. Carrow called the meeting to order and was elected chairman and Dr. S. C. Moore, secretary. The following doctors were present: E. L. Thirlby, Richard Way, J. W. Gauntlett, E. F. Sladek, H. B. Kyselka, Traverse City; Harlan McMullen, Ellery Oakes, H. D. Robinson, Waldemir Hansen, E. C. Hansen, Charles Grant, Katherine Bryan, H. A. Ramsdell, Manistee; Earl and Stephen Fairbank, Luther; L. W. Snutzer, Ludington; F. E. Murphy, Cedar; W. G. Gamble, Bay City; J. L. Burkart and G. H. Yeo, Big Rapids; J. W. Decker, Lake City; L. J. Bronson, Kingsley; C. S. Purdy, Buckley; S. B. Smiseth, Suttons Bay; R. E. Hastings, Elk Rapids; R. E. Mills, Boon; G. W. Brooks, Tustin; H. E. Doudna, Lake City; T. Y. Kimball and W. A. Crawford, Manton; R. R. Haas and L. E. Showalter, Chicago; F. A. Tossey, Evanston, Illinois; J. M. Wardell, G. D. Miller, J. F. Gruber, J. F. Carrow, W. J. Smith, S. C. Moore, Cadillac; W. J. Murphy, Lansing (representing State Department).

Immediately after electing a chairman and secretary for the meeting, Dr. Carrow requested the doctors to stand in silent reverence to the memory of the late Dr. O. L. Ricker.

Dr. Moore was called on to explain the call for poliomyelitis discussion and, after brief remarks, introduced Dr. W. J. Murphy, representing the State Department, who gave the history and plans of organization of the recent poliomyelitis commission and explained methods contemplated to make a survey of convalescent cases in plans to obtain blood to be transported to the State Laboratory, prepared and made available for use in all parts of the State. The doctor responded to many questions and the meeting was turned into general discussion, report of individual cases and experiences of all the doctors. Here I am afraid to mention the doctors' names and what they said from my notes for fear of not quoting exactly and perhaps leaving some out altogether.

After this interesting round table discussion, a recess of ten minutes was taken to give opportunity for any conferences in lieu of selecting a doctor for recommendation to the State President to succeed the late Dr. O. L. Ricker. The meeting was called to order and delegates from the several societies adjourned to the adjoining room. Upon their return they reported Dr. Harlan McMullen of Manistee as the choice made. The entire discussion was friendly and the opinion seemed to prevail that Traverse City and Cadillac had been represented on the Council and Manistee was entitled to the honor.

S. C. MOORE, M.D., *Secretary.*

UPPER PENINSULA SOCIETY

The meeting of the Upper Peninsula Medical Society, which was held in Houghton on August 13 and 14, was one of the most successful ever held by this society. There were registered 112 physicians, approximately 50 per cent of the roster of Upper Peninsula doctors.

The scientific portion of the program was most interesting and instructive, each participant being present, and the papers were received with great interest, as attested by the large number present at each session.

The 1932 meeting will be held at Sault Ste. Marie, Michigan, with the Chippewaw County Medical Society as hosts.

The social portion of the meeting was most beautifully carried out. August 13, the visiting ladies, numbering forty-two, were entertained by the local doctors' wives with a luncheon and bridge at the Onogoming Yacht Club. In the evening of the same day the banquet was attended by 212, and following this, a delightful dancing party was enjoyed at the Yacht Club. The next day the ladies were again entertained with a noon luncheon at the Lake Breeze Hotel at Eagle Harbor.

K. C. BECKER, M.D.,
Chairman, Publicity Committee.

RUPTURE OF SPLEEN IN MALARIAL THERAPY IN SYPHILIS

S. H. Polayes and Max Lederer, Brooklyn, give abstracts of eight cases of rupture of the spleen in malarial therapy in syphilis reported in the literature and to these add a case that they observed. They state that spontaneous rupture of the spleen occurs much more frequently in cases of induced malaria for syphilis of the central nervous system, than in naturally acquired malaria. The usual changes predisposing to rupture, namely, enlargement and softening, are not present in spleens of patients suffering from syphilis of the central nervous system prior to induction of malaria. The increase in fibrous tissue in the capsule and septums with resultant loss of elasticity that occurs in syphilis does, however, predispose to spontaneous rupture. The symptomatology of the complication is briefly described and the importance of its early recognition is emphasized. A plea is made for more careful choice of patients who are to receive malarial therapy to avoid the possible fatal complication—rupture of the spleen.—*Journal A. M. A.*

THE DOCTOR'S LIBRARY

COLLECTED PAPERS OF THE NOON-DAY STUDY CLUB. Wayne County Medical Society, Detroit, 1930-1931. Edwards Brothers, Inc., Ann Arbor, Mich.

The Noon-Day Study Club is an organization of the younger Wayne County physicians and surgeons (we understand the upper age limit is 40 years), which had its beginning four years ago. The Study Club meets Tuesdays and Fridays as a luncheon club, when one of the number presents a paper on some subject pertaining to his work. The paper is read and afterwards a free-for-all discussion takes place. The enthusiasm of the early years of the organization has gathered momentum, as seen in their ambition in publishing the 1930-31 series of papers. Almost every department of medicine and surgery has been included. The volume contains 38 titles in all. The papers give evidence of thoughtful preparation. They are short and to the point. On any that were in the original in any way discursive, the editors have unhesitatingly used the blue pencil to make them conform to the assigned space. With such a variety of subjects we cannot go into detail. We wish, however, to commend the efforts of the Study Club in the production of this their first published volume, which we hope is the first of a series of worthy successors.

GOULD'S MEDICAL DICTIONARY; containing the words and phrases generally used in medicine and the allied sciences, with their definition, pronunciation and derivation. By George M. Gould, A.M., M.D., Edited by R. J. E. Scott, M.A., B.C.L., M.D. Third edition, revised and enlarged, based on recent medical literature. With illustrations and one hundred and seventy-three tables. Pages 1,538. Price indexed $7.50. Philadelphia. P. Blakiston's Son and Company, Inc.

"Dr. George M. Gould is the Johnson of medical lexicography. His various dictionaries, adapted to the needs of the student, practitioner and scholar, respectively, have had a commercial success that of itself is sufficient to prove their practical usefulness," wrote a reviewer in the British Medical Journal, commenting on a former edition of this well known work. The editor has carried on the Gould tradition so that the present revision has brought the work in keeping with present-day science. The features of the original medical dictionary by Gould have been as far as possible preserved. A notable characteristic is the derivations, in which those from the Greek are spelled in the Greek alphabet. The type is clear; the word to be defined is in relief in heavy type, while the definition and derivation are in a legible eight point type. The pronunciation is in italics. The thumb index makes for ready and convenient reference, while the fabrikoid binding makes for durability. The illustrations are clear in detail and serve their purpose well. The reviewer has no hesitation in recommending this volume as one of the most serviceable and scholarly in the English language.

EVOLUTIONARY TENDENCIES IN TEETH AND JAWS

In man the growth of a larger brain, and the cultivation of its complicated functions, call for much more time than is required for the development of other creatures, and during the years thus occupied the eruption of the teeth is delayed. In his lecture to the International Orthodontic Congress in London on Monday, Prof. Elliot Smith pointed out that most of the problems responsible for the creation of the orthodontic profession arise out of the circumstances created by these delays in the growth of the jaw while the brain is growing. If esthetic considerations and man's interest in faces play some part in creating the demand for orthodontics, the growth of the brain is chiefly responsible for disturbing the orderly process of uniform growth of the jaws from which the dental troubles arise. The chin, which is modern man's peculiar distinction, has probably developed because the growth of the tooth-bearing part is restrained by the long delay in the eruption of his teeth. There has been much speculation as to why this should be so, and it is strange, said Prof. Elliot Smith, that no mention has been made of the fact—clearly emphasized by Dr. H. A. Harris—that the human child until the seventh year, during the pause in his dental development, is growing a phenomenally large brain, and for another 15 years or so, while again he is relatively sluggish in his dental affairs, he is occupied in learning how to put his complicated cerebral instrument to the biological uses essential for human existence. The delay in tooth and jaw development is undoubtedly due to these momentous events, and the salient chin is an index of "mental" development in the psychological as well as the anatomical sense of that term.

This wider vision of the evolution of the face, continued the lecturer, enables us to view in truer perspective many false claims that are repeatedly being made about human tendencies. The reduction in size or absence of the third molar is often said to be a sign that man is destined to lose that tooth in the near future. But in Peking Man, who is supposed by some paleontologists to have lived as much as a million years ago, the third molar is smaller than the others, and the same condition is not uncommon in apes and monkeys. It is in fact a tendency which the whole order of Primates has inherited. Nor, in Prof. Elliot Smith's opinion, does there seem to be any justification for the belief that dental troubles, such as crowding and displacement of teeth and the consequential difficulties, are due to evolutionary changes that are now active. There is no evidence that, apart from the results of racial mixture, any detectable changes are taking place in the jaws and teeth. The same irregularities and deficiences were occurring 50 centuries ago and contrasts in the form and proportions of the jaws were just as marked. Evolution works with exceeding slowness, and there appears to be no certain evidence, he said, that any effects that can be attributed to recent evolution have yet been detected in modern man's jaws and teeth.—*From The London Lancet.*

PSYCHOCHEMISTRY: SOME PHYSICO-CHEMICAL FACTORS IN MENTAL DISORDERS

Walter Freeman, Washington, D. C., states that the application of another of the fundamental sciences to the study of behavior, namely biochemistry, is being witnessed today, and the designation pyschochemistry is the natural result. Advances in a science emanate from those who, already versed in two different disciplines, work in the field of knowledge lying between them. Mere collaboration of two different experts will not be so productive, since neither can be completely in sympathy with the point of view of the other. Few biochemists are versed in psychiatry, however, and few psychiatrists have more than a bowing acquaintance with such terms as colloidal dispersion, interfaces, ionic dissociation and oxidation-reduction. Psychochemists, therefore, will be grounded in biochemistry as well as in psychiatry and will investigate the problems of normal and abnormal behavior from the standpoint of altered chemical reactions in that master tissue of the body, the central nervous system. The failure of microscopy to demonstrate structural alterations in the so-called functional psychoses is driving the in-

vestigator into new channels of research. The results of this activity are just beginning to appear and will grow tremendously in volume. What future accomplishments may be witnessed are beyond human power to foretell. Dementia præcox, manic-depressive psychosis, paranoia, epilepsy represent four groups of disorders that rest on no constant well defined alteration in the histology of the nervous system. None can doubt, however, that there exists an underlying structural deviation, provided such a definition is pushed to its logical limits to include molecular and ionic imbalances. Probably the changes are much more gross than that and will be readily demonstrable when proper methods are applied. Such work as that already performed is sufficient to enable one to erect hypotheses concerning the probable underlying physicochemical mechanisms concerned in some of these major abnormalities. Most clearly indicated is the rôle of water balance in epilepsy, although this also involves such mechanisms as hydrion concentration, oxidation-reduction and salt equilibrium. Moreover, the rôle of defective oxidation in the nervous system in schizophrenia also rests on considerable evidence, and the striking parallels, from the chemical standpoint, between the phases of manic-depressive psychosis and the hibernation cycle of certain mammals, point to some phasic alteration in colloidal dispersion and electric potential. In view of its newness the author makes a survey of the field, and the possibilities of its further development. He emphasizes that there are certain biochemical processes associated with disorders of behavior, and that if one is equipped with a knowledge of their workings one may be able, by supplying deficiences, by preventing excesses, by controlling periodic shifts in various equilibriums, to bring about artificially conditions that approach the normal. The psychochemist has a large order.—*Journal A. M. A.*

CAUSES OF FAILURE IN INJECTION TREATMENT OF VARICOSE VEINS

H. O. McPheeters, Charles E. Merkert and R. A. Lundblad, Minneapolis, believe that recurrences of varicose veins following the injection treatment are due to too great dilution of the sclerosing fluid or insufficient concentration of the fluid; failure to thrombose the great saphenous vein in the thigh completely even to the saphenofemoral opening, and normal recanalization, which is Nature's natural effort if the thrombosis is not firm and hard. To prevent recurrences, the operator should: 1. Locate the great saphenous trunk by the percussion method and sclerose it up to the saphenofemoral opening. 2. Empty the veins before injecting, to aid concentration. 3. Localize the sclerosing fluid by the use of tourniquets or the Mac occluders, so as to prevent excessive dilution. 4. Choose sclerosing solutions according to the type and size of veins: for the small, thin walled veins he should use milder solutions, such as invert sugar; for large saccular veins, dextrose with sodium chloride combinations; and for the pick-ups, the quinine and urethane solutions. The authors have discarded the use of salicylates because of the severe pain and cramp. 5. Observe the patient till all the varicose veins are sclerosed satisfactorily. 6. Have the patient return in two months after discharge for check-up and at longer intervals after that. Precautions as to the injections are to: 1. Employ sterile technic. 2. Be sure that the injection is made within the lumen of the vein. 3. Stop the injection immediately when there is doubt as to whether or not the solution is going into the lumen. 4. If a perivascular injection has been made it is best to infiltrate the area of the injection with from 10 to 20 c.c. of physiologic solution of sodium chloride. 5. Apply sponge pressure to prevent leakage when the needle is withdrawn or in case the vein wall has been punctured. 6. Observe the patient every other day for from six to ten days following the initial treatment and then in two months, and see the patient at two to four month intervals after that. Yearly inspection is advisable. —*Journal A. M. A.*

INCIDENCE OF BRAIN TUMORS IN EPILEPSY

Nicholas Gotten, Philadelphia, presents three cases of brain tumor, disclosed in the routine encephalographic studies made on fifty-six epileptic patients in whom the only prominent symptoms were convulsions. One of the cases had been diagnosed as idiopathic epilepsy, one as symptomatic convulsions of hypertension, and the other as post-traumatic (operative) jacksonian epilepsy. The proportion of unsuspected focal lesions in this sort of condition is therefore 5.3 per cent. The beneficial results of early recognition and removal of the tumor are evident and the use of encephalography as a diagnostic procedure is of great value in establishing the characteristic and pathologic changes associated with convulsive seizures. In each of the cases presented, convulsions were the initial symptom; in two cases, clinical neurologic signs were not sufficient to establish the presence or localization of brain tumor, and as there were no signs of generalized intracranial pressure there appeared to be no reason for suspecting such lesions. The use of encephalography for diagnosis and localization of organic lesions of the brain is, therefore, of great value. When properly undertaken with due regard to technic and contraindications, it is a safe and justifiable procedure attended with little risk. The advantages of early recognition of brain tumors and their removal before signs of intracranial pressure develop has given a most satisfactory symptomatic and clinical relief. —*Journal A. M. A.*

"SANE" OBSTETRICS

H. J. Epstein and A. J. Fleischer, New York, believe that the expectant mother should have the benefits of "sane" obstetrics, rather than conservative or radical obstetrics. Such "sane" obstetrics can be maintained within the sphere of the incompetent though sincere physician and of the competent though overenthusiastic physician, by education of the former as to his limitations and of the latter as to the limitations of his modus operandi. The full cognizance by these two groups of the "obstetric risk" as an actual reality rather than a mere fantasy will temper their judgments, so that the incompetent will not plunge where angels fear to tread, and the overenthusiastic will not belabor the expectant mother with heavy artillery where diplomacy will serve better for her ultimate salvation. The obstetric risk in the authors' study shows that: (1) The morbidity risk in operative obstetrics was to that in nonoperative obstetrics in the ratio of 5:1. (2) The mortality risk in operative obstetrics was to that in nonoperative obstetrics in the ratio of 30:1. (3) The total infant mortality risk in operative obstetrics was to that in nonoperative obstetrics in the ratio of 3.6:1 (including spontaneous deliveries of macerated fetuses, premature infants and monstrosities). The mother of today is as fully equipped, mentally and physically, to undergo the hardships of labor as was the mother of yesteryear. A sound realization of this fact, together with a full cognizance of obstetric risk, will diminish the search for new fads to shorten labor and thereby result in a diminished maternal and infant morbidity and mortality.—*Journal A. M. A.*